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Data On Particles And Resonant States*

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Data on the properties of leptons, mesons, and baryons are listed, referenced, averaged, and summarized in tables and wallet cards. This is an updating of the Reviews of Modern Physics article of January 1967.

This data summary is an updating of that of January 1967.[1] An intermediate version was distributed at the Heidelberg International Conference on High Energy Physics held in September 1967.

Only small changes have been made in our procedures and in the tables printed here. We hope that we have saved the reader some time by discussing here only the changes, and referring him to the 1967 text[1] if he should want more details.

We want to reiterate our standing requests:

(1) Please continue to inform us of mistakes and omissions.

(2) We reemphasize that it is inappropriate to make reference to this compilation instead of to the original work; we provide the references, please use them.

TABLES, WALLET SHEETS, BOOKLETS

The three summary tables—one each for Stable Particles, Mesons, and Baryons—are printed once in this text, and are repeated at the back of the article, where they are printed on perforated durable rag paper that seems to survive being carried around, folded, in a wallet for six months. We also provide a very compact summary wallet card for those who feel that the paper sheets are too cumbersome.

In addition, in response to a September 1967 poll, we will soon provide the wallet sheet tables in the form of an insert in an appointment book. For information on how to request any of these tables, see the end of this text, right after the Acknowledgments.

NOTES ON THE TABLES

The notation used in the tables is unchanged since the January 1967 edition.

NOTES ON TABLE S

We are expanding this table to include additional parameters of interest.

Rates. For K decays we are now tabulating partial decay rates in addition to branching ratios. In order to compare the experimental data with theoretical predictions, it is necessary to know the rates and errors coming from an overall fit which takes into account the correlations between the various measured quantities. Our programs provide such fitted quantities.

CP violation in K^0 decays. Parameters of current interest are

$$\eta_{+-}=\frac{A(K_L\to\pi^+\pi^-)}{A(K_S\to\pi^+\pi^-)}=|\,\eta_{\pm}\,|\exp(i\phi_{+-}),$$

$$\eta_{00}=\frac{A(K_L\to\pi^0\pi^0)}{A(K_S\to\pi^0\pi^0)}=|\,\eta_{00}\,|\exp(i\phi_{00}).$$

The phases ϕ_{+-} and ϕ_{00} have been measured directly, whereas the magnitudes $|\,\eta_{+-}\,|$ and $|\,\eta_{00}\,|$ are derived parameters. We have used, as far as we could, the directly measured quantities as input, and have calculated $|\,\eta_{+-}\,|$ and $|\,\eta_{00}\,|$ from the values given by our constrained fits. Therefore, if one looks at the data card listings, the $|\,\eta\,|$ do not appear as such, but in the form of branching ratios, with appropriate comments.

$\Delta S=\Delta Q$ rule in K^0 decays. The validity of this rule is measured by the parameter x defined as

$$x=[A(\bar{K}^0\to\pi^-l^+\nu)/A(K^0\to\pi^-l^+\nu)].$$

We list Re x and Im x.

* Work done under the auspices of the U.S. Atomic Energy Commission.

[1] A. H. Rosenfeld, A. Barbaro-Galtieri, W. J. Podolsky, L. R. Price, Paul Söding, C. G. Wohl, M. Roos, and W. J. Willis, Rev. Mod. Phys. 39, 1 (1967).

Form factors in K leptonic decays. Assuming that only the vector current contributes to these decays, we write the matrix element as

$$\langle \pi \mid J_\lambda \mid K \rangle \propto [f_+(q^2)(P_K+P_\pi)_\lambda + f_-(q^2)(P_K-P_\pi)_\lambda],$$

where P_K and P_π are the four-momenta of K and π mesons; f_+ and f_- are dimensionless form factors which can depend only on $q^2=(P_K-P_\pi)^2$, the square of the momentum transfer to the leptons. The parameters we are listing are

λ_+: the energy dependence of the $f_+(q^2)$ form factor,

$$f_+(q^2) = f_+(0)[1+\lambda_+(q/m_\pi)^2];$$

ξ: the ratio of the two form factors,

$$\xi = f_-/f_+.$$

The quantity ξ can be determined in two ways

(A) by measuring the $K_{\mu 3}/K_{e3}$ branching ratio and lepton (or π^0) momentum spectra, and

(B) by measuring the muon polarization in $K_{\mu 3}$ decays.

The values of ξ obtained with these two methods do not seem to be in agreement at present, for reasons not yet understood. We therefore call them ξ_A and ξ_B and list them separately.

A/V ratio for baryon leptonic decays. The baryon part of the matrix element for these decays may be written as

$$\langle B_f \mid \gamma_\lambda(g_V - g_A\gamma_5) \mid B_i \rangle,$$

where B_i and B_f represent initial and final baryons, and g_A and g_V the axial and vector coupling constants. We compile the ratio g_A/g_V for those decays for which it has been measured.

Appendices. Appendix I compares the predictions of postulated selection rules with the present experimental situation in the field of weak interactions.

NOTES ON THE MESON TABLE

Since the January 1967 edition, three major changes have been made in the Meson Table. (i) The situation of nonstrange mesons with mass >1600 MeV has become badly entangled. We have collected all available reports on these in the data listings and in a sketch attached to the meson table. However, the meson table itself includes only those resonances whose existence and quantum numbers seem better established. (ii) From the $I=\frac{1}{2}$ $K\pi\pi$ states between 1100 and 1300 MeV, two new possible resonances begin to emerge. The general status is still confused; we illustrate it with another sketch. (iii) A 2.5 standard-deviation indication of $H(990)$ production in $K^-n \to \Sigma^- 3\pi$, compatible only with $I=0$, suggests that H is indeed different from the thusfar unobserved neutral $A1$; we include it in the table as a possible resonant state.

NOTES ON THE BARYON TABLE

The greatest change in the state of baryon resonances has come from phase-shift analyses of πN scattering data. To the ten old and (with one or two exceptions) well-established N^*'s having $M<2300$ MeV, there have now been added nine new candidates. Almost all the old resonances have $\Gamma_{el}/\Gamma_{tot}>30\%$; almost all the new ones have $\Gamma_{el}/\Gamma_{tot}<30\%$. None of the new candidates is completely established, and most have been excluded from the summary table. The reader should see the listings for further information on them.

The many pages of listings of data cards may give the impression that the process of obtaining numerical values for the summary tables is systematic and relatively unique. This is definitely not the case for the baryon resonances. Most determinations of resonance parameters are model-dependent, and the values which have been published are usually not accompanied by meaningful statistical uncertainties.

The phase-shift analyses mentioned above provide an excellent example. Almost all nonobsolete information on the N^*'s between the $\Delta(1236)$ and the $N(2190)$ comes from analyses by groups at Saclay, CERN, and LRL (Berkeley). In the first place, while the analyses are in reasonably good qualitative agreement, there are some quantitative differences. In the second place, there is no generally agreed upon way to read the resonance parameters from the sinuous Argand diagrams. Saclay uses two methods for obtaining the resonant energy. They define the resonant energy to be (i) where the partial-wave total cross section is maximal, or (ii) where the amplitude has greatest velocity across the plot. CERN uses a third method: where the absorption is greatest. As the background in the resonant amplitudes is often large, the three methods in general give three different results. In addition, it is difficult to assign meaningful statistical uncertainties to the results, so that even when the three methods are nearly equivalent, it is not apparent how to combine results from different groups.

What choice is made in cases such as these is largely arbitrary, and is indicated in the listings. These also contain a few figures and tables to make comparison among different analyses easier.

PROCEDURES FOR TREATING THE DATA

Our procedures are unchanged since the January, 1967 edition, with the following addition.

Fluctuations in Average Values Since Last Edition

It sometimes happens that the average (or fitted) value for a particular measured quantity changes by

more than one standard deviation between one edition of these tables and the next. We have tried to bring these fluctuating parameters to the attention of the reader by printing them in italics in the Tables. A note is also included in the listings for each, explaining what has caused the value to shift by a large amount since the last edition. The most common reason for this kind of fluctuation is that physicists often report a value and error for a parameter in a conference report or preprint, and then *enlarge* the error by the time the experiment is published in a journal. This has the effect that when we include the preliminary result in our average, the central value shifts sharply towards this new measurement and the error shrinks. Later, when more reasonable errors are published for the experiment in question, the averaged value will again return close to the old number, which is often a shift of more than one shrunken standard deviation. We are attempting to avoid this in the future by not averaging in data from conference reports or preprints *unless* the authors specifically write us that the errors they have quoted are not likely to be enlarged before the paper is published in its final form.

NOTES ON THE DATA CARDS: NOTE A

Apart from one addition to the listings, mentioned below as Note A, the procedures are unchanged.

Note A. For each quantity that has been measured by more than one experiment, we have added a card to the data listings, giving the average value and scaled error for that quantity. In addition, if a constrained fit has been made, we have added a card giving the constrained result.

We illustrate with an example: Assume a particular particle has only three decay modes, P_1, P_2, and P_3 ($\Sigma P_i=1$). Now suppose that three independent branching ratios $R_1=P_1/P_2$, $R_2=P_1/(P_1+P_2)$, $R_3=\cdots$, have been measured (the problem is then overconstrained). From these data our fitting program, AHR, calculates two types of results:

1. P_i^{fitted} with errors (which have always appeared on the tables),
2. R_i^{fitted} with errors (which now appear in the listings, since there is no place for them in the tables).

We also give the straight, unfitted average for each R_i.

EXPLANATIONS OF SYMBOLS USED ON DATA CARDS

The following abbreviations have been used.

1. *Measurement Technique* (TECH)

CC	Cloud chamber
CNTR	Counters, electronics
EMUL	Emulsions
HBC	Hydrogen bubble chambers
HEBC	Helium bubble chambers
DBC	Deuterium bubble chambers
PBC	Propane bubble chambers
XBC	Heavy liquid bubble chambers
SPRK	Spark chambers
MMS	Missing mass spectrometer
RVUE	Review of previous experimental data

2. *Journals*

ADVP	Advances in Physics
ANP	Annals of Physics
ARNS	Annual Reviews of Nuclear Science
BAPS	Bulletin of the American Physical Society
JETP	English Translation of Soviet Physics JETP
NC	Nuovo Cimento
NP	Nuclear Physics
PL	Physics Letters

PPSL	Proceedings of the Physical Society of London
PR	Physical Review
PRL	Physical Review Letters
PRSL	Proceedings of the Royal Society of London
RMP	Reviews of Modern Physics
ZPHY	Zeitschrift für Physik

The following abbreviations refer to proceedings of Conferences.

AIX	International Conference on Elementary Particles, Aix-en-Provence, 1961
ARGONNE	International Conference on Weak Interactions, Argonne National Laboratory, 1965
ATHENS	Athens Topical Conference on Recently Discovered Resonant Particles, Ohio University, 1963
BALATON	Symposium on Weak Interactions, Balatonvilagos, Hungary, 1966
BERKELEY	International Conference on High Energy Physics, 1966
BNL	International Conference on Fundamental Aspects of Weak Interactions, Brookhaven National Laboratory, 1963
BOULDER	Symposium on Strong Interactions 1965
CERN	International Conference on High Energy Physics, 1958 and 1962
CORAL GABLES	Conference on Symmetry Principles at High Energy, 1964 and 1965
DESY	Internation Symposium on Electron and Photon Interactions at High Energies, Hamburg, 1965
DUBNA	International Conference on High Energy Physics, 1964
KIEV	Ninth Annual International Conference on High Energy Physics, 1959
OXFORD	International Conference on Elementary Particles, 1965
ROCH	Fifth (Sixth, Seventh) Annual Rochester Conference on High Energy Nuclear Physics 1955 (1956, 1957). Annual International Conference on High Energy Physics, Rochester, 1960.
SIENA	International Conference on Nucleon Structure, 1963.

Finally,

BNL	Brookhaven National Laboratory
CU	Columbia University, includes Nevis Reports
NYO	New York Operations Office, AEC
UCRL	Lawrence Radiation Laboratory (University of California)
etc.	refer to unpublished reports of the Author's Institution.

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We thank Professor George Trilling for helpful discussions on the selection and treatment of the data on K meson decays. W. J. Podolsky has volunteered valuable help both with the meson data and the data processing; Alan Rittenberg has provided some improved output routines; finally, many physicists have given us helpful suggestions and comments on their data.

EXTRA COPIES OF THE TABLES AND BOOKLET

Copies of the wallet sheets and cards are available from the libraries of the major national laboratories, or may be requested from Scientific Information Service, CERN, or from Technical Information Division, LRL, Berkeley. In order to save on postage, please address European requests to CERN.

The inserts for appointment books will be little 32-page booklets, 3×5 in., (7.5×12.5 cm), available from CERN or LRL. We can also supply inexpensive appointment-address books of the same size. Please state whether you want only the insert, or both.

Table S: STABLE PARTICLES. January, 1968.

A. H. Rosenfeld, N. Barash-Schmidt, A. Barbaro-Galtieri, L. R. Price, Matts Roos, Paul Söding, W. J. Willis, C. G. Wohl

Quantities in italics have changed by more than one standard deviation since January, 1967.

	$I^G(J^P)C$	Mass (MeV)	Mass difference (MeV)	Mean life (sec) $c\tau$(cm)	Mass^2 (GeV)^2	Decays: Partial mode	Fraction		Q (MeV)	‡ p or P_{max} (MeV/c)
γ	$0,1(1^-)^-$	0		stable	0	stable				
ν ν_e ν_μ	$J = \frac{1}{2}$	0(<0.2 keV) 0(<2.1 MeV)		stable	0	stable				
e	$J = \frac{1}{2}$	0.511006 ±.000002		stable ($>2\times10^{21}$y)	0.000	stable	$\mu_e = 1.001159596 \frac{e\hbar}{2m_e c}$ ±.000000023			
μ	$J = \frac{1}{2}$	105.659 ±.002	-33.920 ±.014	2.1983×10^{-6} ±.0008 $c\tau = 6.592\times10^{4}$	0.011	$e\nu\bar{\nu}$	100	%	105	53
	$\mu_\mu = 1.0011666$ ±.0000005 $\frac{e\hbar}{2m_\mu c}$					$e\gamma\gamma$	(<1.6	)10^{-5}	105	53
						$3e$	(<1.3	)10^{-7}	104	53
						$e\gamma$	(<6	)10^{-9}	105	53
$\pi^\pm$	$1(0^-)$	139.579 ±.014	4.6041 ±.0037 (test of CPT)	2.604×10^{-8} ±.007, S=2.3* $c\tau = 781$ $(\tau^+ - \tau^-)/\bar{\tau} = (.4\pm.2)\%$	0.019	$\mu\nu$	100	%	34	30
						$e\nu$	(1.24±0.03)10^{-4}		139	70
						$\mu\nu\gamma$	(1.24±0.25)10^{-4}		34	30
						$\pi^0 e\nu$	(1.03±0.07)10^{-8}		4	5
						$e\nu\gamma$	(3.0 ±0.5)10^{-8}		139	70
π^0	$1^-(0^-)^+$	134.975 ±.014		[d] 0.89×10^{-16} ±.18, S=1.6* $c\tau = 2.67\times10^{-6}$	0.018	$\gamma\gamma$	(98.83±0.04)%		135	67
						γe^+e^-	(1.17±0.04)%		134	67
						$\gamma\gamma\gamma$	(< 5	)10^{-6}	135	67
						$e^+e^-e^+e^-$	[b] (3.47	)10^{-5}	133	67
$K^\pm$	$\frac{1}{2}(0^-)$	493.83 ±0.11	-3.93 ±0.17	1.235×10^{-8} ±.005 S=2.1* $c\tau = 370$ $(\tau^+ - \tau^-)/\bar{\tau} = (.09\pm.12)\%$ (test of CPT) S=1.3*	0.244	$\mu\nu$	[c] (63.58±0.29)%		388	236
						$\pi\pi^0$	(20.94±0.28)%	S=1.1*	219	205
						$\pi\pi^-\pi^+$	(5.57±0.04)%		75	126
						$\pi\pi^0\pi^0$	(1.70±0.05)%		84	133
						$\mu\pi^0\nu$	(3.38±0.17)%	S=1.6*	253	215
						$e\pi^0\nu$	(4.83±0.12)%	S=1.4*	358	229
						$\pi\pi^0 e\nu$	(3.8 ±0.8)10^{-5}		214	204
						$\pi\pi^0 e\bar{\nu}$	(<2	)10^{-6}	214	204
						$\pi\pi^0\mu\nu$	(≤1.4	)10^{-5}	109	151
						$\pi\pi^0\mu\bar{\nu}$	(<3	)10^{-6}	109	151
						$e\nu$	(1.24±0.40)10^{-5}		493	247
						$\pi\pi^0\gamma$	(2.2 ±0.7)10^{-4}		219	205
						$\pi\pi^+\pi^-\gamma$	(10 ±4)10^{-5}		75	126
						$\pi e\nu\gamma$	(6 ±4)10^{-4}		354	227
						πe^+e^-	(<1.1	)10^{-6}	353	227
						$\pi\mu^+\mu^-$	(<2.4	)10^{-6}	143	172
						$\pi\gamma\gamma$	(<1.1	)10^{-4}	354	227
K^0	$\frac{1}{2}(0^-)$	497.75 ±0.18		$50\%K_{short}$, $50\%K_{long}$						
K^0_S	$\frac{1}{2}(0^-)$		-0.48×$\frac{1}{\tau_S}$ ±0.02	0.874×10^{-10} ±.011 S=1.3* $c\tau = 2.61$	0.248	$\pi^+\pi^-$	(68.4 ±1.0)%		219	206
						$\pi^0\pi^0$	(31.6 ±1.0)%		228	209
K^0_L	$\frac{1}{2}(0^-)$			5.30×10^{-8} ±.13 $c\tau = 1593$	0.248	$\pi^0\pi^0\pi^0$	[c] (25.5 ±1.9)%		93	139
						$\pi^+\pi^-\pi^0$	(12.1 ± 0.4)%		84	133
						$\pi\mu\nu$	(27.3 ±1.3)%		253	216
						$\pi e\nu$	(35.1 ±1.4)%		358	229
						$\pi^+\pi^-$	(0.149± 0.006)%		219	206
						[d] $\pi^0\pi^0$	still uncertain		228	209
						$\pi^+\pi^-\gamma$	(< 0.3	)%	219	206
						[d] $\gamma\gamma$	still uncertain		498	249
						$e\mu$	(< 0.8	)10^{-5}	392	238
						$\mu^+\mu^-$	(< 1.5	)10^{-6}	287	225
						e^+e^-	(<1.7	)10^{-5}	497	249
η	$0^+(0^-)^+$	548.8 ±0.6		$\Gamma = (2.3\pm0.5)$keV	Neutral decays 71.0%	$\gamma\gamma$	(42 → 34)%		549	274
						$\pi^0\gamma\gamma$	(1 → 19)%	[d]	414	258
						$3\pi^0$	(28 → 18)%		144	179
					Charged decays 29.0%	$\pi^+\pi^-\pi^0$	(23.4 ± 1.1)%		135	174
						$\pi^+\pi^-\gamma$	(5.5 ±0.5)%		269	236
						$\pi^+\pi^-e^+e^-$	(< 0.04	)%	413	258
						$\pi^+\pi^-e^+e^-$	(0.1 ±0.1)%		268	236
p	$\frac{1}{2}(\frac{1}{2}^+)$	938.256 ±0.005	-1.2933 ±.0001	stable ($>6\times10^{27}$y)	0.880					
n	$\frac{1}{2}(\frac{1}{2}^+)$	939.550 ±0.005		(1.01±0.03)10^3 $c\tau = 3.03\times10^{13}$	0.882	$pe^-\nu$	100	%	1	1
Λ	$0(\frac{1}{2}^+)$	1115.50 ±0.08		2.52×10^{-10} ±.04 S=1.4* $c\tau = 7.61$	1.245	$p\pi^-$	(65.3 ±1.2)%		38	100
						$n\pi^0$	(34.7)%		41	104
						$pe\nu$	(0.88±0.15)10^{-3}		177	163
						$p\mu\nu$	(1.35±0.60)10^{-4}		72	131
Σ^+	$1(\frac{1}{2}^+)$	1189.47 ±0.08	-7.95 ±.11	0.810×10^{-10} ±.013 $c\tau = 2.43$	1.412	$p\pi^0$	(52.8 ±1.5)%		116	189
						$n\pi^+$	(47.2)%		110	185
						$p\gamma$	(1.9 ±0.4)10^{-3}		251	225
						$n\pi^+\gamma$	(≈1.)10^{-3}		110	185
						$\Lambda e^+\nu$	(2.2 ±0.7)10^{-5}		73	72
				$\frac{\Gamma(\Sigma^+ \to \ell^+ n\nu)}{\Gamma(\Sigma^- \to \ell^- n\nu)} = .04^{+.04}_{-.02}$		$n\mu^+\nu$	(< 0.7	)10^{-4}	144	202
						$ne^+\nu$	(< 0.3	)10^{-4}	249	224
Σ^0	$1(\frac{1}{2}^+)$	1192.54 ±0.10	-4.88 ±.06	$<1.0\times10^{-14}$ $c\tau < 3\times10^{-4}$	1.422	$\Lambda\gamma$	100	%	77	75
						Λe^+e^-	[b] (5.45	)10^{-3}		
Σ^-	$1(\frac{1}{2}^+)$	1197.41 ±0.09		1.66×10^{-10} ±.03 S=1.3* $c\tau = 4.95$	1.434	$n\pi^-$	100	%	118	193
						$ne^-\nu$	(1.25±0.17)10^{-3}		257	230
						$n\mu^-\nu$	(0.62±0.12)10^{-3}		152	210
						$\Lambda e^-\nu$	(0.66±0.11)10^{-4}		81	79
						$n\pi^-\gamma$	(≈1)10^{-3}		118	193
Ξ^0	$\frac{1}{2}(\frac{1}{2}^+)$	1314.9 ±0.8	-6.3 ±.7	2.9×10^{-10} ±.4 S=1.2* $c\tau = 8.85$	1.728	$\Lambda\pi^0$	100	%	64	135
						$p\pi^-$	(< 0.5	)%	237	299
						$pe^-\nu$	(< 0.6	)%	376	323
						$\Sigma^+e^-\nu$	(< 0.7	)%	125	119
						$\Sigma^-e^+\nu$	(< 0.6	)%	117	112
						$\Sigma^+\mu^-\nu$	(< 0.7	)%	20	64
						$\Sigma^-\mu^+\nu$	(< 0.6	)%	12	49
						$p\mu^-\nu$	(< 0.6	)%	271	309
Ξ^-	$\frac{1}{2}(\frac{1}{2}^+)$	1321.3 ±0.2		1.73×10^{-10} ±.05 $c\tau = 5.20$	1.746	$\Lambda\pi^-$	100	%	66	139
						$\Lambda e^-\nu$	($0.90^{+0.71}_{-0.43}$)10^{-3}		205	190
						$n\pi^-$	(< 5	)10^{-3}	242	303
						$\Lambda\mu^-\nu$	(< 4.2	)%	100	163
						$\Sigma^0e^-\nu$	(< 0.3	)%	128	122
						$\Sigma^0\mu^-\nu$	(< 0.5	)%	23	70
						$ne^-\nu$	(< 1.0	)%	381	327
Ω^-	$0(\frac{3}{?}^+)$? ?	1672±1		$1.1^{+0.6}_{-0.5}\times10^{-10}$ $c\tau = 3.3$	2.795	$\Xi^0\pi^-$			217	293
						$\Xi^-\pi^0$			216	289
						$\Lambda\pi^-$			63	210

General Atomic and Nuclear Constants [a]

N	$= 6.02252\times10^{23}$ mole^{-1} (based on A_C12=12)
c	$= 2.997925\times10^{10}$ cm sec^{-1}
e	$= 4.80298\times10^{-10}$ esu $= 1.60210\times10^{-19}$ coulomb
1 MeV	$= 1.60210\times10^{-6}$ erg
$\hbar$	$= 6.5819\times10^{-22}$ MeV sec $= 1.05449\times10^{-27}$ erg sec
$\hbar c$	$= 1.9732\times10^{-11}$ MeV cm = 197.32 MeV fermi
k	$= 8.6171\times10^{-11}$ MeV deg^{-1} (Boltzmann const.)
α	$= e^2/\hbar c = 1/137.0388$
m_e	$= 0.511006$ MeV/$c^2 = 1/1836.10\ m_p$
m_p	$= 938.256$ MeV/$c^2 = 1836.10\ m_e = 6.721\ m_{\pi^\pm}$
	$= 1.00727663\ m_H$ (where $m_H = 1$ amu $= \frac{1}{12} m_C{}^{12}$
	$= 931.478$ MeV/c^2)
r_e	$= e^2/m_e c^2 = 2.81777$ fermi (1 fermi $= 10^{-13}$cm)
$\lambda\!\!\!^{-}_e$	$= \hbar/m_e c = r_e\alpha^{-1} = 3.86144\times10^{-11}$ cm
a_∞ Bohr	$= \hbar^2/m_e e^2 = r_e\alpha^{-2} = 0.529167$ A$(1\text{A}=10^{-8}$ cm)
σ Thomson	$= \frac{8}{3}\pi r_e{}^2 = 0.66516\times10^{-24}$ cm$^2 = 0.66516$ barn
μBohr	$= e\hbar/2m_e c = 0.578817\times10^{-14}$ Mev gauss^{-1}
μnucl	$= e\hbar/2m_p c = 3.1524\times10^{-18}$ Mev gauss^{-1}

$\frac{1}{2}\omega_{cyclotron}$ (rad sec^{-1} gauss^{-1})
$= e/2m_e c = 8.79404\times10^{6}$
$= e/2m_p c = 4.7895\times10^{3}$

(continued on the other side)

[a] Based mainly on E. R. Cohen and J. W. M. DuMond, Rev. Mod. Phys. 37, 537 (1965).

Note that there are some disagreements with the results of recent experiments.

Partial Rates (sec^{-1})

$K^\pm$	[c] (51.49 ±0.27)10^6	S=1.1*	
	(6.96 ±0.23)10^6		
	(4.51 ±0.03)10^6		
	(1.38 ±0.04)10^6		
	(2.74 ±0.14)10^6	S=1.6*	
	(3.91 ±0.10)10^6	S=1.4*	
K^0_S	(0.783±0.015)10^{10}		
	(0.362±0.012)10^{10}		
K^0_L	[c] (4.81 ±0.41)10^6		
	(2.29 ±0.09)10^6		
	(5.15 ±0.26)10^6		
	(6.62 ±0.29)10^6		
	(0.028±0.001)10^6		

CP violation parameters [†]

$\eta_{+-} = \frac{A(K_L \to \pi^+\pi^-)}{A(K_S \to \pi^+\pi^-)} = |\eta_{+-}|e^{i\Phi_{+-}}$ $\quad (00)$

$|\eta_{+-}| = (1.89\pm0.09)\times10^{-3}$

$\Phi_{+-} = (65\pm11)^\circ$ S=1.1*

$|\eta_{00}|$ still uncertain, see data listings.

Decay Parameters [†]

	Measured			Derived	
Magnetic Moment ($e\hbar/2m_p c$)	α	Φ(degree)		γ	Δ(degree)
Λ	.647±0.016	(-6±7)°		0.75	(7±8)°
±.16	0.71 ±0.18	S=1.2*			
S=1.2*	0.06 ±0.19	For $\Lambda \to pe\nu$ $\frac{g_A}{g_V} = -1.14^{+0.23}_{-0.33}$†			
Σ^+	-.955±0.070	S=1.1*			
2.5 ±.7	+.017±0.037	(180±30)°		-0.99	(0±85)°
	-.06 ±0.05	(22±30)°		0.90	
	S=1.6*				
	For $\Sigma^- \to \Lambda e\nu$ $\frac{g_A}{g_V} = 0.3\pm0.3$†				
Ξ^0	-.33 ±0.10				
Ξ^-	-.402±.051	(6±8)°			
	S=1.4*	S=1.3*			

† The definition of these quantities is as follows:

$$\alpha = \frac{2\,\mathrm{Re}(S^*P)}{|S|^2+|P|^2};\quad \beta = \frac{2\,\mathrm{Im}(S^*P)}{|S|^2+|P|^2};\quad \gamma = \frac{|S|^2-|P|^2}{|S|^2+|P|^2}$$

$\tan\Phi = \beta/\gamma \qquad \tan\Delta = -\beta/\alpha$

g_A/g_V defined by $M \propto \langle B_f | \gamma_\lambda (g_V - g_A\gamma_5) | B_i \rangle$

* S = Scale factor = $\sqrt{\chi^2/(N-1)}$ where N ≈ number of experiments. S should be ≈ 1. If S > 1, we have enlarged the error of the mean, δx, i.e., δx→S δx. This new convention is still inadequate, since if S > 1, the real uncertainty is probably even greater than Sδx. See text of January 1967 edition.

‡ In decays with more than two bodies, P_{max} is the maximum momentum that any particle can have.

b. Theoretical value, see also data card listings.

c. For comparison with predictions of the $\Delta I = \frac{1}{2}$ rule, see Appendix I.

d. See note in data card listings.

e. This value, not listed in the data cards, was obtained by G. Conforto (Acta Phys. Acad. Hungar. 22, 15 (1967).)

Quantities in italics have changed by more than one standard deviation since January, 1967.

	Symbol (J^P)	$I^G(J^P)C_n$ (⊢⊣ estab., ? – guess)	Mass M (MeV)	Width Γ (MeV)	M^2 ±ΓM(a) (GeV)²	Partial decay modes: Mode	Fraction %	Q (MeV)	p or p_{max}(b) (MeV/c)
$\pi^{\pm}(140)$ $\pi^0(135)$	$\pi(0^-)$	$1^-(0^-)+$	139.58 134.98		0.019 0.018	See Table S			
→η(549)	$\eta(0^-)$	$0^+(0^-)+$	548.8 ±0.6	2.3 kev ±.5 keV	0.301 ±.000	all neutral $\pi^+\pi^-\pi^0+\pi^+\pi^-\gamma$	71 29 }	See Table S	
→$\rho^{\pm}(765)$	$\rho(1^-)$	$1^+(1^-)-$	755-775 (h)	110-140 (h)	0.585 ±.095	ππ $\pi^{\pm}\pi^+\pi^-\pi^0$ $\pi^+\pi^-\pi^+\pi^-$ $\pi^0\gamma$	≈ 100 < 0.2 < 0.15 < 0.4	491 212 212 630	359 247 247 372
$\rho^0(765)$			760-780 (h)	90-150 (h)	0.590 ±.090	$\eta\pi^{\pm}$ e^+e^- $\mu^+\mu^-$	< 0.8 .0055±.0007 (k) .0058±.0010	82 769 559	146 385 370
ω(783)	$\phi'(1^-)$	$0^-(1^-)-$	783.3 ±0.7 S=1.9*	12.2 ±1.3	0.614 ±.009	$\pi^+\pi^-\pi^0$ $\pi^+\pi^-$ $\pi^0\gamma$ η+ neutral $\pi^+\pi^-\gamma$ $\pi^0\pi^0\gamma$ e^+e^- $\mu^+\mu^-$	≈ 90 seen (c) 9.5±0.9 < 1.5 < 5 < 1 *.0053* *+.0015 −.0020* (j) < 0.10	369 504 648 234 504 513 782 572	328 366 380 199 366 368 392 377
η'(958) or X^0 See note (o).	$\eta'(0^-)$	$0^+(0^-)+$	958.3 ±0.8	<4	0.918 <.004	ηππ $\pi^+\pi^-\gamma$(incl. $\rho^0\gamma$) neutrals (excl. ηππ) for upper limits see footnote (f)	67 ± 10 22 ± 3 11 ± 9	131 679	232 458
δ(962) Seen in only one experiment	?( )	≥1 ( )	962 ±5	<5	0.927 <.005	$\delta^{\pm}$ → 1 charged+neutral(s) $\delta^{\pm}$ → ≥ 3 charged+neutral(s)	≈ 60 ≈40		
H(990) existence in doubt (see note (i))	φ(A) ?	$0^-(1^+)-$??	≈990	≲80	0.98	3π	only mode seen (see note (n))	575	440
$\pi_V(1016)$ → $K\bar{K}$	$\pi(0^+)$	$1^-(0^+)+$	1016 ±10 (if resonance)	25 ±5	1.032 ±.025	$K^{\pm}K^0$ ηπ	only mode seen < 70	24 328	110 342
Resonance, virtual bound state, or antibound state, still not distinguished.									
φ(1019)	$\phi(1^-)$	$0^-(1^-)-$	*1019.3* *±0.6* S = 1.5*	3.4 ±0.8	1.039 ±.004	K^+K^- K_LK_S $\pi^+\pi^-\pi^0$ (incl. ρπ) e^+e^- indic. seen, $\mu^+\mu^-$ seen, for other upper limits see footnote (g)	47.3±3.2 38.9±3.1 13.8±4.3 < 0.2 < 0.5	32 24 605 1018 808	126 109 462 510 499
$\eta_V(1070)$ → K_SK_S (Some data still favor large scattering length)	$\eta(0^+)$	$0^+(0^+)+$	1069 ±10 S=2.3*	~ 80 see note (l)	1.14 ±.09	ππ $K\bar{K}$	< 70 >30	793 76	516 198
A1(1070) Existence in doubt (see note (d))	$\pi(1^+)$	$1^-(1^+)+$ (J^P = 2^- not yet excluded)	1070 ±20	80 ±35	1.12	3π (see note (n)) $K\bar{K}$	≈ 100 < 0.25, $G=(-1)^{\ell+I}$ forbids this	651	488
B(1220)	ρ(A) ?	$1^+(1^+)-$?? (J^P= 2^- not excluded)	1220 ±11	129 ±14 S=1.3*	1.46 ±.14	ωπ for upper limits see footnote (m)	≈ 100	297	339
f(1260)	$\eta'(2^+)$	$0^+(2^+)+$	1263 ± 10	*141* *±13* *S = 2.3**	1.57 ±.15	ππ $2\pi^+2\pi^-$ $K\bar{K}$ indic. seen,	large < 4 < *2.5*	984 705 267	616 552 388
D(1285)	η'(A)	$0^+(1^+)+$ (J^P= 0^-, 2^- not excluded)	1285 ±4	32 ±8	1.65 ±.04	$K\bar{K}\pi$ (mainly $\pi_V(1016)\pi$) $K^*\bar{K}+\bar{K}^*K$ ππρ	only mode seen not seen	154 -100 256	304 356
A2(1300) Some evidence for > 1 meson (see data listings).	$\pi(2^+)$	$1^-(2^+)+$	1305 ± 10 S=2.2*	90 ± 10 S=1.2*	1.70 ±.12	ρπ (see note (n)) $K\bar{K}$ ηπ η'π $\pi^+\pi^-\pi^0$(excl. ρπ)	*85.1 ± 2.2* 4.0 ± 1.1 S=1.1* *10.9 ± 2.1* < *10* < 17	395 313 617 207 891	410 424 526 275 615
→→E(1420)	η(A)	$0^+(0^-)+$ (J^P = 1^+ not yet excluded)	1424 ±6	71 ±10 S=1.2*	2.03 ±.10	$K^*\bar{K}+\bar{K}^*K$ $\pi_V(1016)\pi$ ππη ππρ	50 ± 10 50 ± 10 < 88 not seen	38 268 596 384	157 328 569 455
→ f'(1514)	$\eta(2^+)$	$0^+(2^+)+$	1514 ±5	73 ±23 S=1.8*	2.29 ±.11	$K\bar{K}$ $K^*\bar{K}+\bar{K}^*K$ ππ ηππ ηη	72 ± 12 (e) 10 ± 10 (e) < 14 18 ± 10 < 40	518 128 1235 686 417	570 294 744 624 522
→$\pi_A(1640)$ → 3π not yet a completely established resonance	π(A) ?	$1^-(A)+$?	1654 ±12 S=1.6*	109 ±30	2.73 ±.18	3π [ρπ † [fπ † $K\bar{K}$	appears dominant < 40] appears dominant] < 40	1245 745 252 654	797 637 320 658
$\rho_V(1650)$ g→ 2π	ρ(V)	$1^+(V)-$ (J^P= 1^-, 3^-, ... with 3^- favored)	1660 ±17 S=1.4*	169 ±30	2.76 ±.28	2π 4π } ρππ $K\bar{K}$ indication seen, < 10 ωπ indication seen	appears dominant probably observed	1385 1106 615 668 741	820 773 617 667 638
→The remaining data, --e. g., R, S, T, U mesons--in this mass region are too confused to tabulate. →See sketch at upper right.									
$K^+(494)$ $K^0(498)$	$K(0^-)$	$1/2(0^-)$	493.83 497.75		0.244 0.248	See Table S			
→$K^*(890)$	$K(1^-)$ $m_0-m_{\pm}$ = 6.3 ± 4.1	$1/2(1^-)$	892.7 ±0.5 S=1.2*	49.2 ±1.0	0.797 ±.044	Kπ Kππ	≈ 100 < 0.2	259 120	289 216
→→$K_A(1230)$ or C	K(A) Not yet completely established. See footnote (p). J^P = 2^- not yet ruled out.	$1/2(1^+)$	1230	60	1.51 ±.07	See footnote (p)			
→→$K_A(1320)$	K(A) See footnote (p). J^P = 2^- not yet completely ruled out.	$1/2(1^+)$	1320	60	1.74 ±.08	See footnote (p)			
$K_V(1420)$	$K(2^+)$	$1/2(2^+)$	1418.6 ±3.2 S=1.3*	89.1 ±5.1 S=1.1*	2.012 ±.126	Kπ $K^*\pi$ Kρ Kω Kη	51 ± 3 33 ± 3 12 ± 3 2.4± 1 2.1± 1 } S = 1.5*	787 388 156 143 378	615 413 318 304 482
→$K_A(1800)$ or L	K(A) ?	1/2(A) ?	1781 ±14 S=1.7*	72 ±24 S=1.3*	3.17 ±.13	Kπ $K^*\pi$ $K_V(1420)\pi$ Kρ Remaining Kππ Kω Kη	< 2.3 24 ± 8 16 ± 8 10 ± 6 45 ± 15 4.8± 2 < 1	1167 772 245 532 1032 519 754	825 670 317 632 807 624 732

→ The following bumps, excluded above, are listed among the data cards: σ(410); ε(730); $A2_{I=2}(1320)\rightarrow\rho^-\pi^-$; ρρ(1410); $K_SK_S(1440)$; η(1600) → 4π; ρ(1700) → 4π, $K^*\bar{K}$; R_{1-4}(1630-1830); η(1830) → 4π; φ(1830) → ωππ; S(1930); T(2200); $N\bar{N}_{I=0}$(2380), U(2380); κ(725); K_V(1080); $K_{A(I=3/2)}(1175)$; $K_{A(I=3/2)}(1265)$; $K_{A(I=1/2)}(1280)$; $K_{V(I=1/2)}(1660)$.

* Quoted error includes scale factor $S=\sqrt{\chi^2/(N-1)}$. See footnote to Table S.

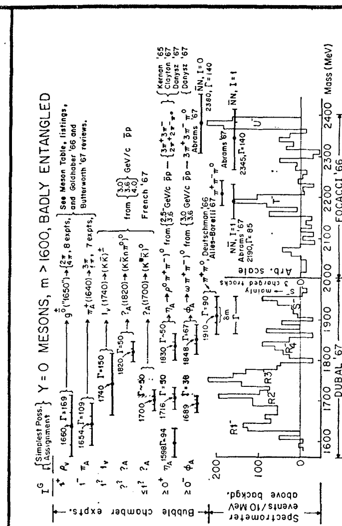
† Square brackets indicate a subreaction of the previous (unbracketed) decay mode.

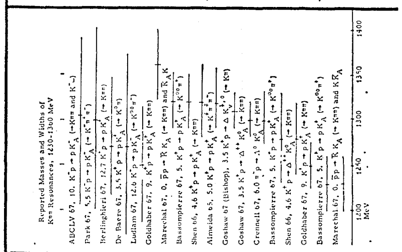
(a) ΓM is the half-width of the resonance when plotted against M^2.

(b) For decay modes into ≥ 3 particles p_{max} is the maximum momentum that any of the particles in the final state can have. The momenta have been calculated using the averaged central mass values, without taking into account the widths of the resonances.

(c) Reported values range between 1% and 15%, and depend on assumptions on ρ-ω interference.

Footnotes continued at right.





(d) Previous evidence from $\pi^{\pm}p \rightarrow (3\pi)^{\pm}p$ has weakened upon the accumulation of more data, thereby reopening the possibility that the A1 enhancement may be due to "Deck effect." However, there are now indications for some A1 production in $\bar{p}p$ annihilation reactions. As for the A1's parameters, they can be only guessed, since there is no clear way to separate effect from background -- πp experiments are beclouded by Deck effect, $\bar{p}p$ by insufficient signal/noise.

(e) There is only a weak indication for a $K^*\bar{K}+\bar{K}^*K$ mode of the f'(1514). If this mode does not exist, the $K\bar{K}$ branching fraction will have to be reported as (80± 13)% (rather than (72± 12)% as given in the table).

(f) Empirical limits on fractions for other decay modes of η'(958): $\pi^+\pi^-$ < 7%, 3π < 7%, 4π < 1%, 6π < 1%, $\pi^+\pi^-e^+e^-$ < 0.6%, $\pi^0e^+e^-$ < 1.3%, ηe^+e^- < 1.1%, $\pi^0\rho^0$ < 4%, $\pi^0\omega$ < 8%.

(g) Empirical limits on fractions for other decay modes of φ(1019): $\pi^+\pi^-$ <20%, ηγ < 8%, η + neutrals < 13%, $\pi^+\pi^-\gamma$ < 4%, ωγ < 5%, ργ < 2%.

(h) The values reported for mass and width of the ρ meson (see data listings) fluctuate so widely that we cannot give averaged values with meaningful errors. The ranges given in the table show where we believe the final values are most likely to fall. Contrast in particular the following results: M^0 = 764±11, Γ^0 = 93±15 (from e^+e^- colliding beams); M^0 = 767±2, Γ^0 = 151±4 (from ππ phase shift analysis); M^0 = 780±2, $M^{\pm}$ = 774±2, $\Gamma^{\pm 0}$ = 128±5 (from compilation of πN → ρN, ρΔ); M^- = 755±5, Γ^- = 110±9 (from Chew-Low extrapolation). (All values in MeV. See listings for the references.)

(i) It seems established that there is a bump in the $(3\pi)^0$ mass spectrum around 1000 MeV although in πN collisions it is seen only between 3 and 4 GeV/c. Recent evidence by Chadwick et al. (LRL/SLAC) for I = 0 suggests that it is indeed different from the $A1^0$ so we list it tentatively as a new resonant state.

(j) SU(3) and ωφ mixing hypothesis used in the analysis of part of the ω → e^+e^- data. Without these data, the rate ω → e^+e^- is (0.02± 0.012)%.

(k) SU(3) and ωφ mixing hypothesis used in the analysis of part of the ρ → e^+e^- data. Without these data, the rate ρ → e^+e^- is (0.0063±.0009)%.

(l) Width of $\eta_V(1070) \rightarrow K_SK_S$: Average value from two bubble chamber experiments Γ = (72± 13)MeV, whereas a spark chamber experiment on K_SK_S gives Γ ≳ 100 MeV (author's fit Γ = 168 MeV) and another spark chamber experiment (observing what might be a $\pi^+\pi^-$ mode) yields Γ < 25 MeV. (For references, see data listings.)

(m) Empirical limits on fractions for other decay modes of B(1220): ππ < 30%, $K\bar{K}$ < 2%, 4π < 50%, φπ < 1.5%, ηπ < 25%, $(K\bar{K})^{\pm}\pi^0$ < 8%, $K_SK_S\pi^{\pm}$ < 2%, $K_SK_L\pi^{\pm}$ < 6%.

(n) ρπ fraction of 3π mode difficult to distinguish because ρ bands cover most of the Dalitz plot. (For an I = 0 meson, the spatial part of the 3π decay matrix element must be completely antisymmetric; therefore one expects p-wave states for the 2π subsystems to be dominant.)

(o) This 0^- meson was named η' on discovery, when it looked as if it completed the 0^- nonet. With the recent evidence that the E(1420) is probably also 0^-, it is no longer clear whether η' or E or both are mixed in with the π, η, K octet; so the name η' may be misleading.

(p) See diagram at right and notes in listings. Some investigators see a broad enhancement in mass (Kππ) from 1200 - 1350 MeV, and others see structure. A further bump at 1280 MeV, Γ = 80 MeV, has been suggested. In light of this confusion, the masses, widths, quantum numbers, and branching ratios are at best tentative. For the mass region 1200 - 1350 MeV, the decay rate into $K^*(890)$ π is large, and a Kρ decay is seen. The Kη, Kω and Kπ rates are less than a few percent (although for Kπ, there is some disagreement among experimenters).

Mixing angles from Quadratic SU(3) Mass Formula: 0^- nonet (π, K, η, η') θ = 10.4° ± 0.2°; 0^- nonet (π, K, η, E) θ = 6.2° ± 0.1°; 1^- nonet (ρ(m = 765± 10 MeV), K^*, φ, ω) θ = 39.4° ± 0.7°; 2^+ nonet (A2, $K_V(1420)$, f', f) θ = 30.2° ± 1.9°.

BARYONS - January, 1968.

Particle or resonance	I(J^P) —— = estab.	Beam π, K (BeV) (BeV/c)	Mass (MeV)	Γ (MeV)	$M^2 \pm \Gamma M$ (BeV^2)	Partial decay modes: Mode	Fraction (%)	p or $p^{\ddagger}_{max}$ (MeV/c)	$4\pi\lambda^2$ (mb)
p	1/2(1/2$^+$)		938.3		0.880	See Table S			
n	——		939.6		0.883				
N'(1470)	1/2(1/2$^+$) P_{11}	T=0.53πp p=0.66	1470	210	2.16 ±0.31	Nπ	65	420	27.8
						Nππ	35		
						[Nσ][a]	[domin]		
N(1518)	1/2(3/2$^-$) D_{13}	T=0.62 p=0.75	1525	115	2.33 ±0.18	Nπ	55	460	23.2
						Nππ	45	414	
						[Δ(1236)π][a]	[domin]	229	
						Nη	~0.5	161	
N(1550)	1/2(1/2$^-$) S_{11}	T=0.66 p=0.79	1550	130	2.40 ±0.20	Nπ	30	477	21.5
						Nη	70	210	
						Nππ	small	434	
N(1680)	1/2(5/2$^-$) D_{15}	T=0.88 p=1.02	1680	170	2.82 ±0.29	Nπ	40	567	15.2
						Nππ	dom. inel.	533	
						[Δ(1236)π][a]	[?]	365	
						ΛK	<1.6	218	
						Nη	<2.5	379	
N(1688)	1/2(5/2$^+$) F_{15}	T=0.90 p=1.03	1690	130	2.86 ±0.22	Nπ	65	574	14.9
						Nππ	dom. inel.	540	
						[Δ(1236)π][a]	[?]	374	
						ΛK	<13	234	
						Nη	<1.5	390	
N'(1710)	1/2(1/2$^-$) S_{11}	T=0.94 p=1.07	1710	300	2.92 ±0.51	Nπ	80	587	14.2
N(2190)	1/2(7/2$^-$) G_{17}	T=1.96 p=2.10	2200	250	4.84 ±0.55	Nπ	30	894	6.13
N(2650)	1/2(? $^-$) ——	T=3.12 p=3.26	2650	360	7.02 ±0.95	Nπ	(J+1/2)x=0.45[b]	1154	3.67
N(3030)	1/2(?) ——	T=4.26 p=4.40	3030	400	9.18 ±1.21	Nπ	(J+1/2)x=0.05[b]	1377	2.62
Δ(1236)	3/2(3/2$^+$) P_{33}	T=0.195 p=0.304	(++) 1236.0 ±0.6	120 ±2	1.53 ±0.15	Nπ	100	231	91.9
						$N\pi^+\pi^-$	0	89	
		$m_0 - m_{++}$ = 0.45±0.85	$m_- - m_{++}$ = 7.9±6.8						
Δ(1640)	3/2(1/2$^-$) S_{31}	T=0.81 p=0.94	1640	180	2.69 ±0.30	Nπ	30	540	16.8
						Nππ	dom. inel.		
Δ(1920)	3/2(7/2$^+$) F_{37}	T=1.41 p=1.54	1950	220	3.80 ±0.43	Nπ	40	741	8.91
						ΣK	seen	453	
Δ(2420)	3/2(11/2$^+$) ——	T=2.50 p=2.64	2420	310	5.86 ±0.75	Nπ	11	1024	4.67
Δ(2850)	3/2(?$^+$) ——	T=3.71 p=3.85	2850	400	8.12 ±1.14	Nπ	(J+1/2)x=0.25[b]	1266	3.05
Δ(3230)	3/2(?) ——	T=4.94 p=5.08	3230	440	10.4 ±1.4	Nπ	(J+1/2)x=0.05[b]	1475	2.24
Z_0(1865)	0(?) —	p=1.15 K^+p Resonance interpretation not established.	1865	180	3.47 ±0.34	NK	(J+1/2)x=0.35[b]	579	14.6
Λ	0(1/2$^+$)		1115.5		1.24	See Table S			
Λ(1405)	0(1/2$^-$) S_{01}	p<0 K^-p	1405	50	1.97 ±0.07	Σπ	100	140	
Λ(1520)	0(3/2$^-$) D_{03}	p=0.392	1518.8 ±1.5	16 ±2	2.31 ±0.02	NK̄	45±4 } S=1.8*	235	83.6
						Σπ	45±4	258	
						Λππ	10±1	251	
Λ'(1670)	0(1/2$^-$) S_{01}	p=0.74	1670	18	2.79 ±0.03	NK̄	$K^-p \to \Lambda\eta$ seen	410	28.5
						Λη		66	
Λ'(1690)	0(3/2$^-$) D_{03}	p=0.78	1690	45	2.86 ±0.08	NK̄	20	429	26.1
						Σπ	58	403	
Λ(1815)	0(5/2$^+$) F_{05}	p=1.05	1816 ±2 S=1.3*	74 ±5	3.30 ±0.14	NK̄	63	538	16.7
						Σπ	11	500	
						Σ(1385)π	11	359	
						Λη	~1	346	
Λ(1830)	0(5/2$^-$) D_{05}	p=1.08	1827	76	3.34 ±0.14	NK̄	8	547	16.0
						Σπ	42	508	
Λ(2100)	0(7/2$^-$) G_{07}	p=1.68	2100	140	4.41 ±0.29	NK̄	33	748	8.68
						Σπ	4	699	
						Λη	<3	617	
						ΞK	≳1	483	
						Λω	<10	443	
Λ(2350)	0(?) —	p=2.29 Seen in total c.s.	2350	210	5.52 ±0.49	NK̄	(J+1/2)x=0.7[b]	913	5.85
Σ	1(1/2$^+$) ——		(+)1189.5 (0)1192.5 (-)1197.4		1.41 1.42 1.43	See Table S			
Σ(1385)	1(3/2$^+$) P_{13}	p<0 K^-p	(+)1382.2±0.8 S=1.6*	(+)37±3 S=2.1*	1.92 ±0.05	Λπ	91±3	208	
						Σπ	9±3	117	
		S=4.8* ! ←→(-) 1388.0±3.0		(-)38±8, S=3.7* !			S=1.4*		
Σ(1660)	1(3/2$^-$) D_{13}	p=0.72 Decay modes of these two states not separated yet.	1660	50	2.76 ±0.08	Λ(1405)π	large	197	
						NK̄	small for both	400	29.9
Σ(1690)	1 (? ?) —	p=0.80	1690	120	2.89 ±0.19	Λπ	large	455	
						Σπ	not disentangled	395	25.1
Σ(1770)	1(5/2$^-$) D_{15}	p=0.95	1767 ±4 S=1.5*	95 ±12 S=2.3*	3.13 ±0.16	NK̄	46	497	19.4
						Λπ	15	519	
						Λ(1520)π	15	190	
						Σ(1385)π	14	317	
						Ση	0.5	140	
						Σπ	~1	463	
Σ(1910)	1(5/2$^+$) F_{15} —	p=1.25 A small effect. Not established beyond all question.	1910	60	3.65 ±0.11	NK̄	8	612	12.9
						Λπ	10	619	
						Σπ	3	568	
Σ(2030)	1(7/2$^+$) F_{17}	p=1.52	2030	120	4.12 ±0.24	NK̄	11	700	9.92
						Λπ	36	700	
						Σπ	9	652	
						ΞK	<2	412	
Σ(2250)	1(?) —	p=2.04 Seen in total c.s.	2250	200	5.06 ±0.45	NK̄	(J+1/2)x=0.3[b]	849	6.76
Σ(2455)	1(?) —	p=2.57 Seen in total c.s.	2455	~140	6.03 ±0.34	NK̄	(J+1/2)x=0.26[b]	979	5.08
Σ(2595)	1(?) —	p=2.95 Seen in total c.s.	2595	~140	6.73 ±0.36	NK̄	(J+1/2)x=0.26[b]	1064	4.30

Ξ	1/2(1/2$^+$)	(0)1314.7 (-)1321.2		1.73 1.75	See Table S				
Ξ(1530)	1/2(3/2$^+$) p-wave	(0)1528.9±1.1 (-)1533.8±1.9	7.3 ±1.7	2.34 ±0.01	Ξπ	100	145		
Ξ(1815)	1/2(?) ——	1815 ±3	16 ±8 S=2.2*	3.29 ±0.03	ΔK̄	~65	391		
					Ξππ	~10	409		
					[Ξ(1530)π][a]	~25	351		
					ΣK̄	<2	220		
		Branching ratios poorly known.					299		
Ξ(1930)	1/2(?) ——	1930 Needs confirmation.	140	3.72 ±0.27	Ξπ	seen	501		
					ΔK̄		504		
Ω$^-$	0(3/2$^+$)	1672		2.80	See Table S				

† at left of Table indicates a candidate that has been omitted because the evidence for the existence of the effect and/or for its interpretation as a resonance is open to considerable question. See listings for information on the following: $N_\gamma(3245)$, N(3690), $Z_0^*(1900)$, Λ(1860) F_{07}, Σ(1780), Σ(3000), and Ξ(1705).

Quoted error includes an S(scale) factor. See footnote to Table S.

* For decay modes into ≥3 particles P_{max} is the maximum momentum that any of the particles in the final state can have. The momenta have been calculated using the averaged central mass values, without taking into account the widths of the resonances.

‡‡ Square brackets indicate a sub-reaction of the previous unbracketed decay mode.

a. J is not known; x is I_e/Γ.

b. Several new resonances have been reported by the CERN group (Donnachie et al.) as a result of their phase-shift analysis up to M = 2100 MeV. The other two groups working on phase-shift analysis (Berkeley, Saclay) have not claimed these states at this time; therefore we have to take them with some caution. For the time being, we classify the nine new CERN resonances as follows: (the numbers in parentheses are M, Γ, [Γ$_{el}$/Γ]^2, slightly rounded): i) Strong candidates, D_{33}(1690, 270, 0.14), F_{35}(1910, 350, 0.16); ii) less certain P_{11}(1930, 340, 0.30), D_{13}(1690, 260, 0.20), F_{15}(1670, 130, 0.32), F_{17}(1980, 220, 0.13); iii) require some imagination, D_{35}(1950, 310, 0.15), P_{13}(1860, 300, 0.21), D_{13}(2060, 290, 0.26).

DATA FOR TABLES ON STABLE PARTICLES

STABLE MEANING IMMUNE TO STRONG DECAY

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

CODE	EVENTS ABOVE BACKGROUND	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECN	SIGN	COMMENTS	DATE PUNCHED

γ

C GAMMA (0,J=1)

ν_e

1 E-NEUTRINO (0,J=1/2)

1 E-NEUTRINO MASS (KEV)

M	*	LESS THAN		0.25	LANGER	52	CNTR			
M	*	LESS THAN		0.15	HAMILTON	53	CNTR			
M	*	LESS THAN	C.55 +OR-	0.28	FRIEDMAN	58	CNTR			

REFERENCES

1 E-NEUTRINO (C,J=1/2)

LANGER	52	PR	88	689	L M LANGER,R J D MOFFAT //////// INDIANA					
HAMILTON	53	PR	92	1521	D HAMILTON,W P ALFORD,L GROSS // PRINCETON					
FRIEDMAN	58	PR	109	2214	LEWIS FRIEDMAN,LINCOLN G SMITH ///// BNL					

ν_μ

2 MU-NEUTRINO (0,J=1/2)

2 MU-NEUTRINO MASS (MEV)

M	*	3.5	CR LESS		BARKAS	56	EMUL			
M	*	4.0	CR LESS		DUDZIAK	59	CNTR			
M	*	3.6	CR LESS		FEINBERG	63	RVUE			
M	*	3.0	CR LESS		ALLCOCK	65	RVUE			
M	*	2.5	CR LESS		BARDON	65	SPRK			
M	*	2.1	CR LESS		SHAFER	65	CNTR	CONF LEV = 68PCT		
M		1.2	CR LESS		BOOTH	67	CNTR	CONF.LEV.=0.68		11/67
M		2.2	OR LESS,CL=0.90		HYMAN	67	HEBC	0. K- HE		11/67

REFERENCES

2 MU-NEUTRINO (C,J=1/2)

BARKAS	56	PR	101	778	W H BARKAS,W BIRNBAUM,F M SMITH //// LRL					
DUDZIAK	59	PR	114	336	W F DUDZIAK,R SAGANE,J VEDDER ////// LRL					
FEINBERG	63	ARNS	13	431	G FEINBERG, L M LEDERMAN //////// COLUMBIA					
ALLCOCK	65	PRSL	85	875	G R ALLCOCK ////////////////// LIVERPOOL					
BARDON	65	PRL	14	449	BARDON,NORTON,PEOPLES +//CCLUM+STONY BROOK					
SHAFER	65	PRL	14	923	R E SHAFER,CROWE,JENKINS //////////// LRL					
BOOTH	67	PREPRINT ULDP	29		+JOHNSON,WILLIAMS,WORMALD // LIVERPOOL					
HYMAN	67	PL	25	B 376	+LOKEN,PEWITT,MCKENZIE,KEYES+/ARG+CARN+NWU					

e

3 ELECTRON (0.5,J=1/2)

3 ELECTRON MASS (MEV)

M		0.511006	0.000002		COHEN	65	RVUE			

3 ELECTRON LIFETIME (UNITS 10**21 YR)

T	*	OVER		2.0	MOE	65	CNTR			

3 ELECTRON MAGNETIC MOMENT(E/2ME)

MM	*	1.0011609	.0000024		SCHUPP	61	CNTR	-		
MM	R	1.001159622	+-(27)*10**-9		WILKINSON	63	CNTR	-		
MM	*	1.001168	C.000011		RICH	66	CNTR	+ POSITRON		
MM		1.001159596	+-(23)*10**-9		RICH	67				11/67
MM	RICH 67 IS REEVALUATION OF WILKINSON 63									

REFERENCES

3 ELECTRON (0.5,J=1/2)

SCHUPP	61	PR	121	1	A A SCHUPP,R W PIDD,H R CRANE // MICHIGAN					
WILKINSO	63	PR	130	852	D T WILKINSON,H R CRANE ////////// MICHIGAN					
COHEN	65	RMP	37	537	E R COHEN, J W M DUMOND //// NAASC+CALTECH					
MOE	65	PR	140	B 992	M K MOE,F REINES //// CASE INST TECHNOLOGY					
RICH	66	PRL	17	271	A RICH, H R CRANE // MICHIGAN					
RICH	67	CONF ON AT.MASSES			A RICH ////////////////////////// MICHIGAN					

μ

4 MUON (1C6,J=1/2)

4 MUON MASS (MEV)

M		105.659	0.002		FEINBERG	63	RVUE			

4 MUON LIFETIME (UNITS 10**-6)

T		2.198	0.001	0.001	FARLEY	62	CNTR			
T		2.203	0.004		LUNDY	62	CNTR	CONLEV=.58		11/67
T		2.202	0.003	0.003	ECKHAUSE	63	CNTR			
T		2.197	0.002	0.002	MEYER	63	CNTR	+		
T		2.198	0.002	0.002	MEYER	63	CNTR	-		
T	AVG	2.1983	.0008		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					

4 RATIO OF LIFETIME OF MU+ TO MU-

DT		1.000	0.001		MEYER	63	CNTR	LIFETIME MU+/MU-		

4 MUON PARTIAL DECAY MODES

P1		MUON INTO E (E-NEU) (MU-NEU)						S 3S 1S 2		
P2		MUON INTO E 2GAMMA						S 3S 0S 0		
P3		MUON INTO 3ELECTRONS						S 3S 3S 3		
P4		MUON INTO E GAMMA						S 3S 0		

4 MUON BRANCHING RATIOS

R1	*	MUON INTO E+2GAMMA (IN UNITS OF 10**-5)						(P2)/(P1)		
R1	*	LESS THAN		1.6	FRANKEL 1	63	SPRK			
R2	*	MUON INTO 3E (IN UNITS OF 10**-7)						(P3)/(P1)		
R2	*	LESS THAN		5.0	PARKER 1	62	CNTR			
R2	*	LESS THAN		1.3	ALIKHANOV	62	SPRK			
R2	*	LESS THAN		1.5	FRANKEL 2	63	CNTR			
R2	*	LESS THAN		1.45	BABAEV	63	SPRK			
R3	*	MUON INTO E+GAMMA (IN UNITS OF 10**-8)						(P4)/(P1)		
R3	*	LESS THAN		1.2	FRANKEL 1	63	SPRK			
R3	*	LESS THAN		0.6	PARKER 2	64	SPRK			

4 MUON ANOMALOLS MAGN. MOMENT (10**-6*E/(2*MUON MASS))

MM		1162.0	5.0		CHARPAK	62	CNTR	+		
MM		1165.0	3.0		FARLEY	66	CNTR	- STORAGE RINGS		
MM	P	1166.6	0.5		BAILEY	67	CNTR	- STORAGE RING		11/67
MM	P	PRELIMINARY RESULT								
MM	AVG	1164.2059	2.5725		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					

REFERENCES

4 MUON (1C6,J=1/2)

CHARPAK	61	PRL	6	126	CHARPAK,FARLEY,GARWIN,MULLER,SENS + //CERN					
HUTCHINS	61	PRL	7	129	D P HUTCHINSON,J MENES + ////// COLUMBIA					
ALIKHANC	62	CERN CONF		423	A I ALIKHANOV,A BABAEV + /// ITEP MOSCOW					
CHARPAK	62	PL	1	16	G CHARPAK,F J M FARLEY,R L GARWIN + //CERN					
FARLEY	62	CERN CONF		415	FARLEY,MASSAM,MULLER,ZICHICHI ///// CERN					
LUNDY	62	PR	125	1686	RICHARD A LUNDY ////////////////////// EFINS					
PARKER	62	NC	23	485	S PARKER,S PENMAN ////////////////////// EFINS					
SHAPIRO	62	PR	125	1C22	G SHAPIRO,L M LEDERMAN /////////// COLUMBIA					
BABAEV	63	JETP	16	1397	BABAEV,BALATS,KAFTANOV,LANDSBERG + // ITEP					
ECKHAUSE	63	PR	132	422	M ECKHAUSE,T A FILIPPAS + /////// CARNEGIE					
FEINBERG	63	ARNS	13	431	GERALD FEINBERG, L M LEDERMAN /// COLUMBIA					
FRANKEL	63	NC	27	894	S FRANKEL,W FRATI,J HALPERN + ////// PENNA					
FRANKEL	63	PR	130	351	S FRANKEL,W FRATI,J HALPERN + ////// PENNA					
MEYER	63	PR	132	2693	S L MEYER,ANDERSON,BLESER,LEDERMAN+//COLUP					
PARKER	64	PR	1336	768	S PARKER,H L ANDERSON,C REY //////// EFINS					
FARLEY	66	NC	45A	281	FARLEY,BAILEY,BROWN,GIESCH + // CERN					
BAILEY	67	HEIDELBERG CONF.			+BARTL,BROWN,PICASSO,FARLEY + // CERN+RMCS					

OLD REFERENCES NOT REFERRED TO IN DATA CARDS

FISHER	59	PRL	3	349	FISHER,LEONTIC,LLNOBY,MELNIER,STROOT//CERN					
ASTBURY	60	ROCH CONF	60	542	ASTBURY,HATTERSLEY,HUSSAIN + // LIVERPOOL					
DEVONS	60	PRL	5	330	DEVONS,GIDAL,LEDERMAN,SHAFIRC // COLUMBIA					
LATHROP	60	NC	17	109	J LATHROP,R A LUNDY,W L TELEGDI + // EFINS					
LATHROP	60	NC	17	114	J LATHROP,R A LUNDY,S PENMAN + //// EFINS					
REITER	60	PRL	5	22	REITER,ROMANOWSKI,SUTTON + ///// CARNEGIE					
TELEGDI	60	ROCH CONF	60	713	W L TELEGDI ////////////////////////// CERN					

$\pi^\pm$

8 CHARGED PION (140,JPG=C--) I=1

8 CHARGED PI MASS (MEV)

M		139.37	0.20		CROWE	54	CNTR	-		
M		139.68	0.15		BARKAS	56	EMUL	+		
M		139.577	0.014		SHAFER	65	CNTR			
M	AVG	139.5769	.0139		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					

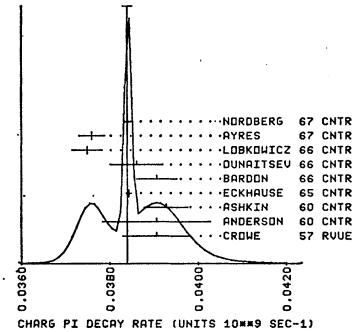
8 PI+ MU+ MASS DIFFERENCE (MEV)

D		34.00	0.076		BARKAS	56	EMUL			
D		33.89	0.076		BARKAS	56	EMUL			
D	AVG	33.9450	.0550		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					

8 CHAR.PI LIFETIME (UNITS 10**-9)

T		25.6	0.5	0.5	CROWE	57	RVUE			
T		25.6	0.8	0.8	ANDERSON	60	CNTR			
T	8000	25.46	0.32	0.32	ASHKIN	60	CNTR	+		
T	*				MERRISON	62	RVUE			
T		26.02	0.04		ECKHAUSE	65	CNTR	+		
T		25.6	0.3		BARDON	66	CNTR			
T		25.9	0.4		DONAITSEV	66	CNTR			
T	N	26.40	0.08		KINSEY	66	CNTR	+		
T	N	SYSTEMATIC ERRORS IN CALIBR.IN THIS EXP. DISCUSSED BY NORDBERG 67								8/67
T		26.67	0.24		LOBKOWICZ	66	CNTR			
T		26.6	0.2		AYRES	67	CNTR			
T		26.04	0.05		NORDBERG	67	CNTR	+		8/67
T	AVG	26.0410	.0689		AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3) (SEE IDEOGRAM)					

WEIGHTED AVERAGE = 0.038401 ± 0.000101
SCALE = 2.28 CHISQ = 15.6 CONLEV = 0.001



CHARG PI DECAY RATE (UNITS 10**9 SEC-1)

8 MEANLIFE DIFFERENCE,(+)-(-)/AVGE. (PERCENT)

DT	N	THIS QUANTITY IS A MEASURE OF CPT INVARIANCE IN K.I.					
DT		0.23	0.40	LOBKOWICZ 66 CNTR	SEE NOTE L		
DT	L	ABOVE IS THE MOST CONSERVATIVE VALUE QUOTED BY AUTHORS					
DT		0.4	0.7	BARDON 66 CNTR			
DT		0.56	0.28	AYRES 67 CNTR			
DT		* * * * * * * * *					
DT	AVG	.4465	.2180	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

8 CHARGED PION PARTIAL DECAY MODES

P1	CHAR.PION INTO MU (MU-NEU)	S 4S 2
P2	CHAR.PION INTO E (E-NEU)	S 3S 1
P3	CHAR.PION INTO MU (MU-NEU) GAMMA	S 4S 2S 0
P4	CHAR.PION INTO PIO E (E-NEU)	S 9S 3S 1
P5	CHAR.PION INTO E NEU GAMMA	S 3S 1S 0

8 CHARGED PION BRANCHING RATIOS

R1	*	CHAR.PION INTO MU NEU GAMMA	(UNITS 10**-4)		(P3)/(P1)	
R1		26 1.24	0.25	CASTAGNOL 58 EMUL		
R2	*	CHAR.PION INTO E NEU	(UNITS 10**-4)		(P2)/(P1)	
R2		1.21	0.07	ANDERSON 60 CNTR		
R2		1.247	0.028	DI CAPUA 64 CNTR		
R2		* * * * * * * * *				
R2	AVG	1.2419	.0260	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R3	*	CHAR.PION INTO PIO E NEU	(UNITS 10**-8)		(P4)/(P1)	
R3		36 0.97	0.20	BARTLETT 64 SPRK		
R3		38 1.07	0.21	BACASTOW 65 SPRK +		
R3		1.10	0.26	BERTRAM 65 SPRK		
R3		43 1.1	0.2	DUNAITSEV 65 CNTR		
R3		1.01	0.08	0.10 DEPOMMIER 66 CNTR		
R3		* * * * * * * * *				
R3	AVG	1.0287	.0689	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R4	*	CHAR.PION INTO E NEU GAMMA	(UNITS 10**-8)		(P5)/(P1)	
R4		143 3.0	0.5	DEPOMMIER 63 CNTR		

REFERENCES
8 CHARGED PION (140,JPG=C--)I=1

CROWE	54 PR 96 470	K M CROWE,R H PHILLIPS ////////////////// LRL
BARKAS	56 PR 101 778	W H BARKAS,W BIRNBAUM,F M SMITH ////// LRL
CROWE	57 NC 5 541	K M CROWE //////////////////// STANFORD HEPL
CASTAGNO	58 PR 112 1779	C CASTAGNOLI,M MLCHNIK ////////// ROME I F
ANDERSON	60 PR 119 2050	H L ANDERSON,T FUJII,R H PILLER + // EFINS
ASHKIN	60 NC 16 490	ASHKIN,FAZZINI,FIDECARO,LIPMAN + //// CERN
MERRISON	62 ADVP 11 1	A W MERRISON //////////////////// LIVERPOOL
SHAPIRO	62 PR 125 1022	G SHAPIRO,L M LEDERMAN ////////// COLUMBIA
CZIRR	63 PR 130 341	JOHN B CZIRR ////////////////////////// LRL
DEPOMMIE	63 PL 7 285	P DEPOMMIER,HEINTZE,RUBBIA,SOERGEL // CERN
BARTLETT	64 PR 136B 1432	BARTLETT,DEVONS,MEYER,ROSEN ///// COLUMBIA
DI CAPUA	64 PR 133B 1333	DI CAPUA,GARLAND,PONDROM,STRELZOFF //COLUM
BACASTOW	65 PR 139 B407	+GHESQUIERE,WIEGAND,LARSEN //LRL+SLAC
BERTRAM	65 PR 139 B 617	BERTRAM,MEYER,CARRIGAN+ //// MICH+CARNEGIE
CLINE	65 PL 15 293	A CLINE,W F FRY ////////////////// WISCONSIN
DUNAITSE	65 JETP 20 58	DUNAITSEV,PETRUKHIN,PROKOSHKIN + /// DUBNA
ECKHAUSE	65 PL 19 348	ECKHALSE,HARRIS,SHULER+// WILLIAM AND MARY
SHAFER	65 UCRL 16365 THESIS	RCBERT E SHAFER ////////////////////// LRL
REPLACES	65 PRL 14 923	R E SHAFER,K M CROWE,D A JENKINS ///// LRL
BARDON	66 PRL 16 775	BARDON,BORE,DORFAN,KRIEGER + //// COLUMBIA
DEPOMMIE	66 PRIV COMM	DEPOMMIER,SOERGEL ////////////////// CERN
DUNAITSE	66 PL 23 283	+KUTYIN,PROKOSHKIN,RASUVAEV,SINONOV//DUBNA
KINSEY	66 PR 144 1132	KINSEY,LOBKOWICZ,NORDBERG //ROCHESTER UNIV
LOBKOWIC	66 PRL 17 548	LCBKOWICZ,MELISSINOS,NAGASHIMA+ //ROCH+BNL
AYRES	67 PL 24B 483	D S AYRES,CALDWELL,GREENBERG,KURZ+ /// LRL
ALSO	67 PR 157 1288	AYRES,CALDWELL,GREENBERG,KENNEY,KURZ+//LRL
NORDBERG	67 PL 24B 594	NORDBERG,LOBKOWICZ,BURMAN //ROCHESTER UNIV

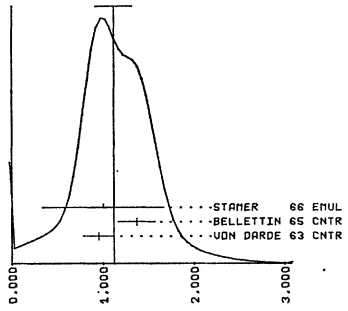
π^0

9 NEUTRAL PION (135,JPG=C--) I=1

9 PI MASS DIFFERENCE (PI+-)-(PIO)(MEV)

D	*	5.37	1.0	PANOFSKY 51 CNTR	-
D		4.50	0.31	CHINOWSKY 54 CNTR	-
D		4.62	0.05	HADDOCK 59 CNTR	-
D		4.60	0.04	HILLMAN 59 CNTR	
D		4.55	0.07	CASSELS 59 CNTR	
D		4.6056	0.0055	CZIRR 63 CNTR	
D		4.55	0.03	PETRUKHIN 63 CNTR	-
D		4.6034	0.0052	VASILEVSK 66 CNTR	-
D		* * * * * * * * *			
D	AVG	4.6041	.0037	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)	

WEIGHTED AVERAGE = 1.120 ± 0.202
SCALE = 1.59 CHISQ = 2.5 CONLEV = 0.111



NEUTRAL PI DECAY RATE(UNITS 10**16SEC-1)

9 PIO LIFETIME (UNITS 10**-16)

T	N	76	1.9	0.5	0.5	GLASSER	61 EMUL	
T	N	45	2.3	1.1	1.0	TIETGE	62 EMUL	
T	N	88	2.8	0.9	0.9	KOLLER	63 EMUL	SEE STAMER 66
T			1.05	0.18	0.18	VON DARDE	63 CNTR	
T	N	75	1.7	0.5		SHWE	64 EMUL	
T			0.730	0.105		BELLETTIN	65 CNTR	
T	N	67	1.6	0.6	0.5	EVANS	65 EMUL	
T	N	OLD EMULSION MEASUREMENTS NOT USED BECAUSE OF POSSIBLE SYSTEMATIC						
T	N	SHIFT TO LARGER LIFETIME VALUES						
T		232 1.0	0.5			STAMER	66 EMUL	SEE NOTE K BELOW 8/67
T	K	INCLUDES EVENTS OF KOLLER 63						8/67
T		* * * * * * * * *						
T	AVG	.8931	.1815	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)				
		(SEE IDEOGRAM)						

9 NEUTRAL PION PARTIAL DECAY MODES

P1	PIO INTO 2GAMMA	S 0S 0
P2	PIO INTO E+ E- GAMMA	S 3S 3S 0
P3	PIO INTO 4ELECTRONS	S 3S 3S 3S 3
P4	PIO INTO 3 GAMMA	S 0S 0S 0

9 NEUTRAL PION BRANCHING RATIOS

R1	*	PIO INTO (GAMMA E+ E-)/(2GAMMA)			(P2)/(P1)	
R1	*	0.01196 THEORETICAL CALC.JOSEPH		61	QUANTUM ELECT.	
R1		27 0.0117	0.0015	BUDAGOV	60 HBC	
R1		3071 0.01166	0.00047	SAMIOS	61 HBC	PI-P TO PIO N
R1	S	SAMIOS VALUE USES PANOFSKY RATIO = 1.62				
R1		* * * * * * * * *				
R1	AVG	.0117	.0004	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R2	*	PIO INTO (3 GAMMA)/(2 GAMMA) (UNITS 10**-6)			(P4)/(P1)	
R2	*	0 5.0 OR LESS		DUCLOS	65 CNTR	CL=90 PERCENT
R3	*	PIO INTO (E+E+E-E-)/(2 GAMMA) (UNITS 10**-5)			(P3)/(P1)	
R3	*	3.47 THEORETICAL CAL. KROLL		55	QUANTUM ELECT.	
R3		146 3.16	0.30	SAMIOS	62 HBC	SEE NOTE N BELOW
R3	N	ABOVE VALUE USES PANOFSKY RATIO=1.62				

REFERENCES
9 NEUTRAL PION (135,JPG=C--)I=1

PANOFSKY	51 PR 81 565	W K H PANOFSKY,R L AAMODT,J HADLEY /// LRL
CHINOWSK	54 PR 93 586	W CHINOWSKY,J STEINBERGER /////// COLUMBIA
KROLL	55 PR 98 1355	N KROLL +W WACA // COLUMBIA+NRLW
CASSELS	59 PPS 74 92	CASSELS,JONES,MURPHY,O.NEILL /// LIVERPOOL
HADDOCK	59 PRL 3 478	HADDOCK,ABASHIAN,CROWE,CZIRR ////////// LRL
HILLMAN	59 NC 14 887	HILLMAN,MIDDELKOOP,YAMAGATA,ZAVATTINI/CERN
BUDAGOV	60 JETP 11 755	BUDAGOV,VIKTOR,CZHELEPOV,ERMOLOV + //JINR
JOSEPH	60 NC 16 997	O W JOSEPH // EFI
GLASSER	61 PR 123 1014	R G GLASSER,N SEEMAN,B STILLER /////// NRL
SAMIOS	61 PR 121 275	N P SAMIOS //////////////////// COLUMBIA+BNL
SAMIOS	62 PR 126 1844	SAMIOS,PLANO,PRODELL + ////// COLUMBIA+BNL
TIETGE	62 PR 127 1324	J TIETGE,W PUESCHEL ////// MAX PLANCK INST
CZIRR	63 PR 130 341	JOHN B CZIRR ////////////////////////// LRL
KOLLER	63 NC 27 1405	E L KOLLER,S TAYLOR,T HUETTER //// STEVENS
KOLLER	63 SEE ALSO STAMER 66	
PETRUKHI	63 SIENA CONF 208	V I PETRUKHIN,YU D PROKOSHKIN /////// JINR
VONDARDE	63 PL 4 51	VON DARDEL,DEKKERS,MERMOD,VAN PUTTEN+/CERN
SHWE	64 PR 136B 1839	H SHWE,F M SMITH,W H BARKAS ////////// LRL
BELLETTI	65 NC 40 A 1139	BELLETTINI,BERTRAND,BRACCINI+/PISA+FIRENZE
DUCLOS	65 PL 19 253	DUCLOS,FREYTAG,HEINTZE + //CERN+HEIDELBERG
EVANS	65 PR 139 B 982	D A EVANS ////////////////////////// OXFORD
STAMER	66 PR 151 1108	STAMER,TAYLOR,KOLLER,HUETTER+ //// STEVENS
VASILEVS	66 PL 23 281	VASILEVSKY,VISHNYAKOV,DUNAITSEV + // DUBNA

$K^{\pm}$

10 CHARGED K (494,JP=0-) I=1/2

10 CHARGED K MASS (MEV)

M		493.9	0.2	COHEN	57 RVUE +	
M		493.7	0.3	BARKAS	63 EMUL -	
M		493.78	0.17	GREINER	65 EMUL +	VIA TAU DECAY
M		* * * * * * * * *				
M	AVG	493.8099	.1189	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

STABLE PARTICLES

1G CHAR.K LIFETIME (UNITS 10**-8)

T	*	CHAR. K LIFETIME							
T			0.95	0.36	0.25	ILOFF	56 EMUL		
T		52	1.66	0.3	0.3	EISENBERG	58 EMUL		
T			1.21	0.06	0.06	BURROWES	59 CNTR		
T		33	1.32	0.24	0.24	FREDEN	60 EMUL		
T			1.25	0.22	0.17	BARKAS	61 EMUL		
T		51	1.27	0.36	0.23	BHOWMIK	61 EMUL		
T		293	1.31	0.08	0.08	NORDIN	61 HBC	-	
T	*		1.24	0.C7		NORDIN	61 RVUE	-	
T			1.231	0.011	0.011	BOYARSKI	62 CNTR	+	
T			1.2443	0.0036		FITCH	65 CNTR	+	
T			1.2265	0.0036		LOBKOWICZ	66 CNTR	+	
T			1.221	0.011		FORD	67 CNTR	+-	8/67
T	G		1.244	0.005		GIACOMELL	67 CNTR	+	8/67
T	G	GIACOMELLI 67 VALUE JUST A CHECK ON APPARATUS							
T		* * * * * * * * *							
T	AVG		1.2343	.0052	AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)				
T	FIT		1.235	.003	VALUE FROM CONSTRAINED FIT				
		(SEE IDEOGRAM)							

1G LIFETIME DIFFERENCE,(+)-(-)/AVGE. (PERCENT)

DT	N	THIS QUANTITY IS A MEASURE OF CPT INVARIANCE IN W.I.					
DT		0.049	0.097	LOBKOWICZ 66 CNTR	SEE NOTE L		
DT	L	ABOVE IS THE MOST CONSERVATIVE VALUE QUOTED BY AUTHORS					
DT		0.47	0.30	FORD 67 CNTR			8/67
DT		* * * * * * * * *					
DT	AVG	.0868	.1232	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)			

1G DECAY RATES DIFF.,(+)-(-)/AV. (PERCENT)

D1	*	DIFFERENCE IN K MU2 RATES ((W1+)-(W1-))/W1				
D1		-0.54	0.41	FORD 67 CNTR		8/67
D2	*	DIFFERENCE IN TAU RATES ((W2+)-(W2-))/W2				
D2		-0.04	0.21	FORD 67 CNTR		8/67
D2		-0.50	0.50	FLETCHER 67 SPRK		8/67
D2		* * * * * * * * *				
D2	AVG	-.0638	.2045	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		

1G CHARGED K DECAY RATES

W1	*	CHAR. K INTO MU NEU (K MU)	(UN. 10**6 SEC-1) (P1)			
W1		51.2	0.8	FORD 67 CNTR +-		8/67
W1		* * * * * * * * *				
W1	FIT	51.487	.270	VALUE FROM CONSTRAINED FIT		
W2	*	CHARG. K INTO PI PI+ PI- (TAU) (UN. 10**6 SEC-1) (P3)				
W2		4.496	0.030	FORD 67 CNTR +-		8/67
W2		* * * * * * * * *				
W2	FIT	4.511	.028	VALUE FROM CONSTRAINED FIT		

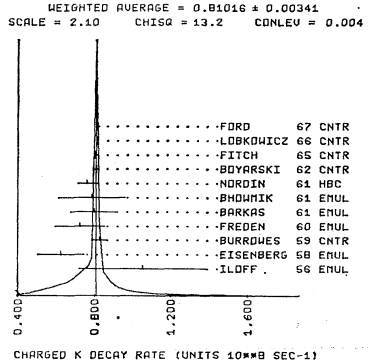
1G CHARGED K PARTIAL DECAY MODES

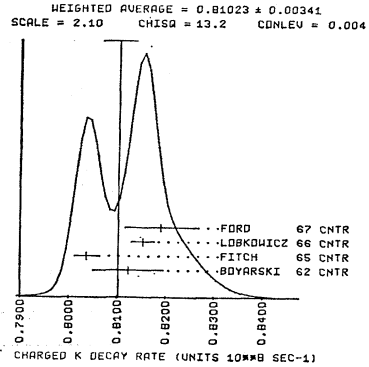
P1	CHAR. K INTO MU (NEU)	K MU	S 4S 2
P2	CHAR. K INTO PI PIO	K PI	S 8S 9
P3	CHAR. K INTO PI PI+ PI-	TAU	S 8S 8S 8
P4	CHAR. K INTO PI 2PIO	TAU PRIME	S 8S 9S 9
P5	CHAR. K INTO MU PIO NEU	K MU	S 4S 9S 2
P6	CHAR. K INTO E PIO NEU	K E	S 3S 9S 1
P7	POSIT.K INTO PI+ PI- E+NEU	K E+	S 8S 8S 3S 1
P8	POSIT.K INTO PI+ PI+ E-NEU	K E-	S 8S 8S 3S 1
P9	POSIT.K INTO PI+ PI- MU+ NEU	K+MU+ 4	S 8S 8S 4S 2
P10	POSIT.K INTO PI+ PI+ MU- NEU	K+MU- 4	S 8S 8S 4S 2
P11	CHAR. K INTO E NEU	K E 2	S 3S 1
P12	CHAR. K INTO MU NEU GAMMA	K MU RAD	S 4S 2S 0
P13	CHAR. K INTO PI PIO GAMMA	K PI RAD	S 8S 9S 0
P14	CHAR. K INTO PI PI+ PI- GAMMA	TAU RAD	S 8S 8S 8S 0
P15	CHAR. K INTO PI E+ E-	PI E E	S 8S 3S 3
P16	CHAR. K INTO PI MU+ MU-	PI MU MU	S 8S 4S 4
P17	CHAR. K INTO PI GAMMA GAMMA	PI GAM GAM	S 8S 0S 0
P18	CHAR. K INTO PI E NEUTRINO GAMMA	PI E NEU GAM	S 8S 3S 1S 0

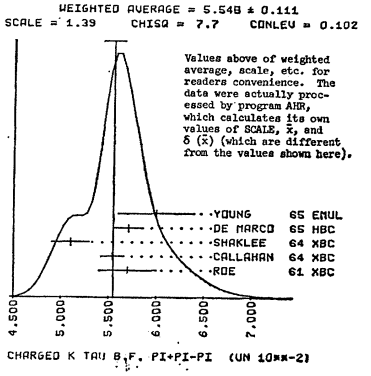
1G CHARGED K BRANCHING RATIOS

R	0	OLD DATA EXCLUDED				
R1	*	CHAR. K INTO MU NEU (MU2)	(UNITS 10**-2)	(P1)/TOTAL		
R1	0	58.5	3.0	BIRGE 56 EMUL +		
R1	0	56.9	2.6	ALEXANDER 57 EMUL +		
R1		* * * * * * * * *				
R1	FIT	63.577	.293	VALUE FROM CONSTRAINED FIT		

R2	*	CHAR. K INTO PI PIO (PI2)	(UNITS 1C**-2)	(P2)/TOTAL		
R2	0	27.7	2.7	BIRGE 56 EMUL +		
R2	0	23.2	2.2	ALEXANDER 57 EMUL +		
R2	*	21.0	0.6	CALLAHAN 65 PBC	SEE R17	
R2	*	21.6	0.6	TRILLING 65 RVUE		
R2		* * * * * * * * *				
R2	FIT	20.942	.279	VALUE FROM CONSTRAINED FIT		
R3	*	CHAR. K INTO PI PI+ PI-(TAU)	(UNITS 1C**-2)	(P3)/TOTAL		
R3	C	5.6	0.4	BIRGE 56 EMUL +		
R3	C	6.8	0.4	ALEXANDER 57 EMUL +		
R3	0	5.2	0.3	TAYLOR 55 EMUL +		
R3		5.7	0.3	RCE 61 XBC +		
R3	2332	5.54	0.12	CALLAHAN 64 XBC +		
R3	540	5.1	0.2	SHAKLEE 64 XBC +		
R3		5.71	0.15	DE MARCO 65 HBC		
R3	44	6.0	0.4	YOUNG 65 EMUL +		
R3		* * * * * * * * *				
R3	AVG	5.5477	.1112	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)		
R3	FIT	5.570	.036	VALUE FROM CONSTRAINED FIT		
		(SEE IDEOGRAM)				
R4	*	CHAR. K INTO PI 2PIO (TAU PRIME)	(UNITS 1C**-2)	(P4)/TOTAL		
R4	0	2.1	0.5	BIRGE 56 EMUL +		
R4	0	2.2	0.4	ALEXANDER 57 EMUL +		
R4	0	1.5	0.2	TAYLOR 59 EMUL +		
R4		1.7	0.2	RCE 61 XBC +		11/67
R4	108	1.8	0.2	SHAKLEE 64 XBC +		11/67
R4		* * * * * * * * *				
R4	AVG	1.7500	.1414	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R4	FIT	1.701	.048	VALUE FROM CONSTRAINED FIT		
R5	*	CHAR. K INTO MU PIO NEU (MU3)	(UNITS 1C**-2)	(P5)/TOTAL		
R5	0	2.8	1.0	BIRGE 56 EMUL +		
R5	0	5.9	1.3	ALEXANDER 57 EMUL +		
R5	0	2.8	0.4	TAYLOR 59 EMUL +		
R5		* * * * * * * * *				
R5	FIT	3.377	.170	VALUE FROM CONSTRAINED FIT		
R6	*	CHAR. K INTO E PIO NEU (E3)	(UNITS 1C**-2)	(P6)/TOTAL		
R6	0	3.2	1.3	BIRGE 56 EMUL +		
R6	0	5.1	1.3	ALEXANDER 57 EMUL +		
R6		5.0	0.5	RCE 61 XBC +		11/67
R6	429	4.7	0.3	SHAKLEE 64 XBC +		11/67
R6		* * * * * * * * *				
R6	AVG	4.7794	.2572	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R6	FIT	4.832	.119	VALUE FROM CONSTRAINED FIT		
R7	*	POSIT.K INTO PI+ PI- E+ NEU	(UNITS 1C**-5)	(P7)/TOTAL		
R8	*	POSIT.K INTO PI+ PI+ E- NEU	(UNITS 1C**-5)	(P8)/TOTAL		
R8		0.2 CR LESS		BIRGE 65 FBC + 95 PER CT CONF		
R9	*	POSIT.K INTO PI+ PI- MU+ NEU	(UNITS 1C**-5)	(P9)/TOTAL		
R9		1 0.77 0.54 0.5C		CLINE 65 FBC +		
R10	*	POSIT.K INTO PI+ PI+ MU- NEU	(UNITS 1C**-6)	(P10)/TOTAL		
R10		0 3.0 OR LESS		BIRGE 65 FBC + 95 PER CT CONF		
R11	*	CHAR. K INTO E NEU	(UNITS 1C**-5)	(P11)/TOTAL		
R11	*	160.0 CR LESS		BCRREANI 64 HBC + CONLEV=C.95		11/67
R11		4 2.1 1.8 1.3		BOWEN 67 SPRK +		8/67
R11	*	BOWEN RESULT SHOULD BE CORRECTED TO 1.5(+1.7,-1.2) BECAUSE OF				
R11	*	K+ TO E+ NEU GAMMA DECAYS BEFORE COMPARING WITH ECTTERILL'67 R28				
R12	*	CHAR. K INTO MU NEU GAMMA	(UNITS 1C**-5)	(P12)/TOTAL		
R13	*	CHAR. K INTO PI PIO GAMMA	(UNITS 1C**-4)	(P13)/TOTAL		
R13	*	16 2.2 0.7		CLINE 64 FBC + PI+ KE 55-90 MEV		
R14	*	CHAR. K INTO PI PI+ PI- GAMMA	(UNITS 1C**-6)	(P14)/TOTAL		
R14		1.0 0.4		STAMER 65 EMUL +		
R15	*	CHAR. K INTO PI E+ E-	(UNITS 1C**-6)	(P15)/TOTAL		
R15		1 1.1 CR LESS		CAMERINI 64 FBC +		
R15	*	0.4 CR LESS		CLINE 67 +		11/67
R15		4.4 CR LESS		BISI 67 DBC + 90 PER CT CONF		11/67
R16	*	CHAR. K INTO PI MU+ MU-	(UNITS 1C**-6)	(P16)/TOTAL		
R16		3.0 CR LESS		CAMERINI 65 FBC + 90 PER CT CONF		
R16		2.4 CR LESS		BISI 67 DBC + 90 PER CT CONF		11/67
R17	*	CHAR. K INTO (PI PIO)/TAU		(P2)/(P3)		
R17	134	3.24 0.34		YOUNG 65 EMUL +		
R17	1045	3.96 0.15		CALLAHAN 66 FBC +		
R17		* * * * * * * * *				
R17	AVG	3.8427 .2659	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.9)			
R17	FIT	3.760 .057	VALUE FROM CONSTRAINED FIT			
R18	*	CHAR. K INTO (PI 2PIO)/TAU		(P4)/(P3)		
R18	2027	0.303 0.009		BISI 65 HBHL +		
R18	17	0.393 C.099		YOUNG 65 EMUL +		
R18		* * * * * * * * *				
R18	AVG	.3037 .0090	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			
R18	FIT	.305 .008	VALUE FROM CONSTRAINED FIT			







NOTE: Left ideogram contains all the data. Right ideogram contains only those in the central peak.

STABLE PARTICLES

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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R19 *   CHAR. K INTO (MU PIO NEL)/TAU                    (P5)/(P3)
R19    2175    0.632    0.035          BISI      65 H+HL +
R19      38    0.90     0.16           YOUNG     65 EMUL +
R19     636    0.507    0.035          CALLAHAN  66 HLBC +                    8/67
R19          * * * * * * * *
R19 AVG          .5772    .0622   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.5)
R19 FIT          .606     .031    VALUE FROM CONSTRAINED FIT
                      (SEE IDEOGRAM)

R20 *   CHAR. K INTO (E PIO NEU)/TAU                     (P6)/(P3)
R20     230    0.90     0.06           BORREANI  64 HBC  +
R20      37    0.90     0.16           YOUNG     65 EMUL +
R20     873    0.722    0.038          CALLAHAN  66 HLBC +                    8/67
R20     854    0.94     0.09           BELLOTTI  67 HLBC                      11/67
R20          * * * * * * * *
R20 AVG          .7555    .0536   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)
R20 FIT          .867     .022    VALUE FROM CONSTRAINED FIT
                      (SEE IDEOGRAM)

R21 *   POSIT.K INTO (PI+ PI- E+ NEU)/TAU(UNITS 10**-4)(P7)/(P3)
R21      69     6.7      1.5            BIRGE     65 FBC  +

R22 *   POSIT.K INTO (PI+ PI- ML+ NEU)/TAU(UNITS 10**-4)(P9)/(P3)
R22       1     2.5   APPROX            GREINER   64 EMUL +
R22       7     2.57     1.55           BISI      67 OBC  +                    11/67

R23 *   CHAR. K INTO (E PIO NEU)/(MU2+PI2)(UNITS 10**-2)(P6)/(P1+P2)
R23    1679    5.89     0.21           CESTER    66 SPRK +                    8/67
R23    5110    6.16     0.22           ESCHSTRUT 67 SPRK +                    11/67
R23          * * * * * * * *
R23 AVG          6.0167   .1519   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R23 FIT          5.717    .149    VALUE FROM CONSTRAINED FIT

R24 *   CHAR. K INTO (PI PIO)/(MU NEU)                   (P2)/(P1)
R24              0.3253   0.0065         AUERBACH  67 SPRK +                    8/67
R24          * * * * * * * *
R24 FIT          .329     .006    VALUE FROM CONSTRAINED FIT

R25 *   CHAR. K INTO (E PIO NEU)/(ML NEU)                (P6)/(P11
R25     472    0.0797   0.0054         AUERBACH  67 SPRK +                    8/67
R25 *   THE VALUE .0785+-.0025 GIVEN IN THE ABOVE REF IS AN AVERAGE OF
R25 *   AUERBACH 67 R25 AND CESTER 66 R23.
R25     561    0.069    0.006          DEVONS    67 SPRK +                    11/67
R25          * * * * * * * *
R25 AVG          .0749    .0053   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
R25 FIT          .076     .002    VALUE FROM CONSTRAINED FIT

R26 *   CHAR. K INTO (MU PIO NEU)/(MU NEU)               (P5)/(P1)
R26     310    0.0602   0.0046         AUERBACH  67 SPRK +                    8/67
R26     424    0.055    0.004          DEVONS    67 SPRK +                    11/67
R26          * * * * * * * *
R26 AVG          .0572    .0030   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R26 FIT          .053     .003    VALUE FROM CONSTRAINED FIT

R27 *   CHAR. K INTO (MU NEU)/(TAU)                      (P1)/(P3)
R27 R   427   10.38     0.82           YOUNG     65 EMUL +
R27 R DELETED FROM OVERALL FIT BECAUSE YOUNG 65 CONSTRAINS HIS RESULTS TO
R27 R TO ADD UP TO 1.  ONLY YOUNG MEASURED MU2 DIRECTLY.
R27          * * * * * * * *
R27 FIT          11.413   .096    VALUE FROM CONSTRAINED FIT

R28 *   CHAR. K INTO (E NEU)/(MU NEU) (UNITS 10**-5)     (P11)/(P1)
R28      10     1.9      0.7      0.5   BCTTERILL 67 SPRK +                    11/67

R29 *   CHAR. K INTO (MU PIO NEU)/(E PIO NEU)            (P5)/(P6)
R29 *                0.65     0.05           AACHEN    67          PRELIMINARY 11/67
R29          * * * * * * * *
R29 FIT          .659     .040    VALUE FROM CONSTRAINED FIT

R30 *   CHAR. K INTO PI GAMMA GAMMA/TOTAL(UNITS 10**-4)(P17)/TOTAL
R30              1.1   CR LESS            CHEN      67 SPRK +                    11/67

R31 *   CHAR. K INTO PI E NEU GAMMA/PI E NEU              (P18)/(P6)
R31              0.012    0.008          BELLOTTI  67    +                      11/67

R32 *   CHAR. K INTO (PI2 + MU3)/(TOTAL)                 (P2+P5)/TOTAL          11/67
R32 *   WE COMBINE THESE TWO MODES FOR EXPTS MEASURING THEM IN XENON BC
R32 *   BECAUSE OF DIFFICULTIES OF SEPARATING THEM THERE
R32          23.4     1.1            ROE       61 XBC  +                    11/67
R32     886  25.4     0.9            SHAKLEE   64 XBC  +                    11/67
R32          * * * * * * * *
R32 AVG          24.5580  .9802   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
R32 FIT          24.319   .284    VALUE FROM CONSTRAINED FIT

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                    10  CHARGED K FORM FACTORS                                 8/67

LM+ *   LAMBDA +  (LINEAR ENERGY DEPENDENCE OF F+ IN KE3 DECAY)                 8/67
LM+ *   FOR RAD. CORR. TO THE CALITZ PLOT, SEE GINSBERG 67.

LM+ *  217   +0.038    .045           BROWN     62 XEBC +  PIC SPEC,NO R.C.
LM+ *  230   -0.04     .05            BORREANI  64 HBC  +  E+ SPEC,NO R.C.     8/67
LM+ *  407   -0.010    .029           JENSEN    64 XEBC +  PIO SPEC,NO R.C.    8/67
LM+ B  457   +0.025    .018           BELLOTTI  66 FBC  +  SEE NOTE B BELOW    8/67
LM+ *  854   0.045     0.017    0.018 BELLOTTI  67          SEE NOTE B BELOW   11/67
LM+ B     BELLOTTI 67 REPLACES BELLOTTI 66.USES CALITZ PLOT WITH RAD. COR.    11/67
LM+ * 1393   +0.016    .016           IMLAY     67 SPRK + CLTZ PLT,NO R.C.     8/67
LM+ *  515   +0.028    .013    .014 KALMUS     67 FBC  + E,PI SPEC,NO R.C.    8/67
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XIA *  XIA = F-/F+ (DETERMINED FROM SPECTRA AND KMU3/KE3)

XIA *   76   +1.8      1.6            BROWN     62 XEBC +  MU+,PIO SPECTRA    8/67
XIA *   87   +0.7      0.5            GIACOMELL 64 EMUL +  MU+ SPECTRUM       8/67
XIA *         -0.1      0.7            JENSEN    64 XEBC +  MU+,PIO SPECTRA    8/67
XIA *         -0.17     0.75     0.99  SHAKLEE   64 XEBC +  KMU3/KE3          8/67
XIA *         +0.6      0.5            BISI      65 HBC  +  KMU3/KE3,MU SPEC  8/67
XIA *       BTWN +0.2 AND +1.4         CUTTS     65 SPRK +  MU+ SPECTRUM       8/67
XIA * 1509   +0.4      0.4      0.22  CALLAHAN  66 FRBC +  KMU3/KE3            8/67
XIA * 2646    0.0      1.1      0.9   CALLAHAN  66 FRBC +  MU+ SPECTRUM       8/67
XIA *  444   +0.72     0.37           CALLAHAN  66 FRBC +  PIC SPECTRUM       8/67
XIA *         -0.5      0.3            AACHEN    67       +  KMU3/KE3 PRELIM  11/67
XIA *         +0.75     0.50           AUERBACH  67 SPRK +  KMU3/KE3          8/67
XIA *  976   +1.0      0.3            DEVONS    67 SPRK +  KMU3/KE3          8/67

XIB *  XIB = F-/F+ (DETERMINED FROM ML POLARIZATION IN KML3)

XIB * 2100   +1.2      2.4      1.8   BORREANI  65 PBC  +  POLARIZATION       8/67
XIB *       BTWN -4.0 AND +1.7         CUTTS     65 SPRK +  POLARIZATION       8/67
XIB *         -1.32     0.33           AACHEN    66 FRBC +  POLARIZATION       8/67
XIB *  397   -1.4      1.8            CALLAHAN  66 FRBC +  TOTAL PCLAR.        8/67
XIB * 2950   -0.7      0.9      3.3   CALLAHAN  66 FRBC +  LONG. PCLAR.        8/67

XIB *  MEAS OF XI USING POLARIZATION IS LESS SENSITIVE TO FORM FACTOR
XIB *  VARIATIONS AND PROBABLY GIVES A BETTER EXPERIMENTAL VALUE
                    (SEE IDEOGRAM)
 ****** ********* ********* ********* ********* ********* ********* *********
                                REFERENCES
                                1C CHARGED K (454,JP=0-)I=1/2

BIRGE    56 NC   4   834       BIRGE,PERKINS,PETERSON,STORK,WHITEHEAD//LRL
ILOFF    56 PR 102   927       ILOFF,GOLDHABER,LANNUTTI,GILBERT + /// LRL
ALEXANDE 57 NC   6   478       ALEXANDER,JOHNSTON,O'CEALLAIGH//DUBLIN INST
COHEN    57 FUND.CONS.PHYS.    E R COHEN,K M CROWE,J DUFFNE // AI+LRL+CIT
EISENBER 58 NC   8   663       EISENBERG,KOCH,LOHRMANN,NIKOLIC + /// BERN
BURROWES 59 PRL  2   117       BURROWES,CALDWELL,FRISCH,HILL + ////// MIT
TAYLOR   59 PR 114   359       S TAYLOR,HARRIS,CREAR,LEE,RAHMEL//CCLLMBIA

FREDEN   60 PR 118   564       S C FREDEN,F C GILBERT,R S WHITE ///// LRL
BARKAS   61 PR 124 1209        BARKAS,DYER,MASEN,NORRIS,NICKOLS,SMIT//LRL
BHOWMIK  61 NC  20   857       B BHOWMIK,P C JAIN,P C MATHUR //DELHI UNIV
NORDIN   61 PR 123 2166        PAUL NORDIN JR ////////////////////////// LRL
ROE      61 PRL  7   346       ROE,SINCLAIR,BROWN,GLASER + ///// MICH+LRL
BOYARSKI 62 PR 128 2398        BOYARSKI,LOH,NIEMELA,RITSON ////////// MIT
BROWN    62 PRL  8   450       BROWN,KADYK,TRILLING,ROE+/////////LRL,MICH

BARKAS   63 PRL 11   26        W H BARKAS,J N DYER,H H HECKMAN ////// LRL
BIRGE    63 PRL 11   35        BIRGE,ELY,GIDAL,CAMERINI + // LRL+WIS+BARI
ADAIR    64 PL 12  67                                    // YALE,BNL
BORREANI 64 PL   12 123        G BORREANI,G RINALDO,A WERBROUCK /// TURIN
CALLAHAN 64 PR  136 B 1463     A CALLAHAN,R MARCH,R STARK ///// WISCONSIN
CAMERINI 64 PRL  13 316        CAMERINI,CLINE,FRY,POWELL // WISCONSIN+LRL
CLINE    64 PRL  13 101        D CLINE, W F FRY ////////////// WISCONSIN
GIACOMEL 64 NC 34  1134        GIACOMELLI,PONTI,CUARENI+// BOLOGNA,PLNICH
GREINER  64 PRL 13 284         D GREINER, W OSBORNE, W BARKAS /////// LRL
JENSEN   64 PR  136 B1431      JENSEN,SHAKLEE,ROE,SINCLAIR ///// MICHIGAN
SHAKLEE  64 PR  136 B 1423     SHAKLEE,JENSEN,ROE,SINCLAIR ///// MICHIGAN

BIRGE    65 PR 139 B 1600      BIRGE,ELY,GIDAL,CAMERINI,CLINE + //LRL+WIS
BISI     65 NC   35  768       BISI,BORREANI,CESTER,FERRARC + ///// TURIN
BISI     65 PR 139 B 1068      BISI,MARZARI-CHIESA,RINALDC // TURINC,INFN
BORREANI 65 PR 140 B1686       BORREANI,GIDAL,RINALDO,CAFCRIO+/BARI,TURIN
CALLAHAN 65 PRL  15  129       A CALLAHAN,D CLINE ////////////// WISCONSIN
CAMERINI 65 NC   37 1795       CAMERINI,CLINE,GIDAL,KALMUS,KERNAN/WIS+LRL
CLINE    65 PL   15  293       A CLINE,W F FRY ////////////////// WISCONSIN
CUTTS    65 PR 138 B969        CUTTS,ELICOFF,STIENING //          // LRL
DEBOUARD 65 PL  15   58        DEBOUARD,DEKKERS,JORDAN+/WLNICH,CERN,CRSAY
DE MARCO 65 PR 140 B 1430      DE MARCC,GROSSO,RINALDO ////// TURINC+CERN
FITCH    65 PR 140 B 1088      FITCH,QUARLES,WILKINS //PRINCETON+MT HOLYK
GREINER  65 ARNS  15  67       CLOTED BY BARKAS                  // LRL
STAMER   65 PR  138 B 440      STAMER,HUETTER,KOLLER,TAYLOR,GRAUMAN//STEV
TRILLING 65 UCRL 16473         GEORGE H TRILLING ////////////////////// LRL
TRILLING 65   IS UPDATED FROM 1965 ARGONNE CONF, PAGE   5
YOUNG    65 UCRL 16362         PCH-SHIEN YOUNG (THESIS,BERKELEY) //// LRL
  ALSO   67 PR 156 1464        P-S YOUNG,W.Z.OSBORNE,W.H.BARKAS ///// LRL

AACHEN   66 BERKELEY CONF 28   AACHEN-BARI-BERGEN-CERN-EP-NIJ-ORSAY-PADUA
BELLOTTI 66 PL   20  690       BELLOTTI,FIORINI,PULLIA+ ////////// MILAN
CALLAHAN 66 PR  150 1153       CALLAHAN,CAMERINI+/WISC,LRL,RIVERSIDE,BARI
  ALSO   66 NC  44A 90         A C CALLAHAN ////////////////////WISCONSIN
CESTER   66 PL 21 343          CESTER,ESCHSTRUTH,ONEILL+ //PRINCETON-PENN
CESTER   66    SEE ALSO FOOTNOTE 1 OF AUERBACH 67
LOBKOWIC 66 PRL  17  548       LOBKOWICZ,MELISSINOS,NAGASHIMA+ //ROCH+BNL

AACHEN   67 HEIDELBERG CONF    AACHEN,BARI,CERN,PADOVA,VALENCIA,MADRID
AACHEN   67 CORRECTED VALUE GIVEN AT NOV 67 PRINCETON CONF
AUERBACH 67 PR 155 1505        AUERBACH,DOBBS,MANN+ ////// PRINCETON-PENN
BELLOTTI 67 NC TO BE PUB       BELLOTTI,FIORINI,PULLIA ////////////// MILAN
BISI     67 PL 25B  572        BISI,CESTER,CHIESA,VIGONE ////////// TCRINO
BOTTERIL 67 PRL  19  982       BOTTERILL,BROWN,CORBETT,CLELLIGAN +//CXFORD
BOWEN    67 PR  154 1314       BOWEN,MANN,MCFARLANE,HUGHES+/PENN-PRINCETG
CHEN     67 UCRL 17887         CHEN,CUTTS,KIJEWSKI,STIENING +/// LRL,MIT
CLINE    67 HEIDELBERG CONF    CLINE,HAGGERTY,SINGLETON,FRY+////WISCONSIN
DEVONS   67 PR  TO BE PUB      +GARLAND,MEYER,PONDROM+/CCLLMBIA,RUTG,WISC
ESCHSTRU 67 PR  TO BE PUB      ESCHSTRUTH,FRANKLIN,HUGHES+//PRINCETON,PENN
FLETCHER 67 PRL  19  98        FLETCHER,BEIER,EDWARDS,+//////////ILLINOIS
FORD     67 PRL  18 1214       +LEMONICK,NAUENBERG,PIRCLE //PRINCETON
GIACOMEL 67 BNL 11056          GIACOMELLI,KYCIA,LI,TEIGER ////////// BNL
GINSBERG 67 PR  162  1570      EDWARD S GINSBERG ////////// L. MASS ACSTON
IMLAY    67 PR  160  1203      IMLAY,ESCHSTRUTH,FRANKLIN+////////PRINCETON
KALMUS   67 PR  159  1187      KALMUS,KERNAN ////////////////////////// LRL
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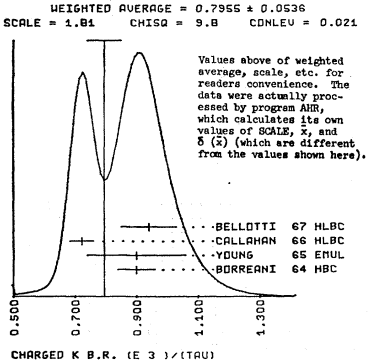
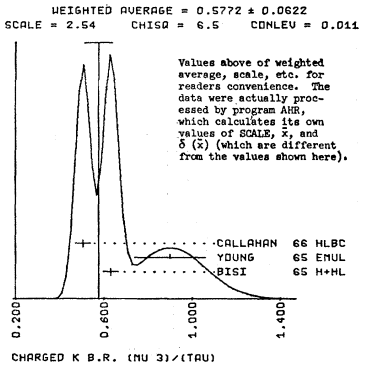
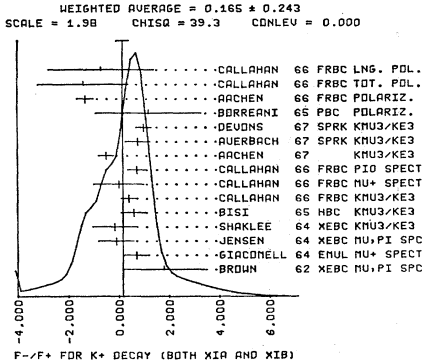






ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

K^0

11 NEUTRAL K (JP=C-) I=1/2

11 K0 MASS (MEV)

M		498.1	0.4		CHRISTENS	64 SPRK		
M	2223	497.44	0.33		KIM	65 HBC	K0 FROM PBAR P	
M	4500	496.9	0.5		BALTAY	66 HBC	K0 FROM PBAR P	
M		497.44	0.50		FITCH	67 SPRK		11/67
M		* * * * * * * *						
M	AVG	497.8653	.3158	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)				
		(SEE IDEOGRAM)						

11 K0-K CH. MASS DIFFERENCE (MEV)

D		3.9	0.6		ROSENFELD	59 HBC	-	
D		5.4	1.1		CRAWFORD	59 HBC	+	
D	9	3.90	0.25		BURNSTEIN	65 HBC	-	
D	25	3.71	0.35		KIM	65 HBC	- K- P TO K0 N	
D		* * * * * * * *						
D	AVG	3.8888	.1896	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

REFERENCES
11 NEUTRAL K (JP=C-)I=1/2

CRAWFORD 59 PRL 2 112 CRAWFORD,CRESTI,GOOD,STEVENSON,TICHO //LRL
ROSENFEL 59 PRL 2 110 A H ROSENFELD,F SOLMITZ,R C TRIPP //// LRL
CHRISTEN 64 PRL 13 138 CHRISTENSON,CRONIN,FITCH,TURLAY//PRINCETON
BURNSTEI 65 PR 138 B 895 R A BURNSTEIN,H A RUBIN ///////// MARYLAND
KIM 65 PR 140 B 1334 J K KIM,L KIRSCH,D MILLER /////// COLUMBIA
BALTAY 66 PR 142 932 BALTAY,SANDWEISS,STONEHILL + //YALE+BNL
FITCH 67 PR TO BE PUB FITCH,RGTH,RUSS,VERNON ///////// PRINCETON

K^0_1

12 SHORT-LIVED NEUTRAL K (498, JP=C-) I=1/2

12 K01 LIFETIME (UNITS 1C**-1C)

T	90	1.07	0.13	0.13	BOLDT	58 CC		
T	512	0.94	0.05	0.05	CRAWFORD	59 HBC		
T	63	1.05	0.18	0.15	BOWEN	60 CC		
T	378	0.94	0.05	0.05	BERTANZA	62 HBC		
T	503	0.87	0.05		CHRETIEN	63 PBC		
T	545	0.86	0.04		KREISLER	64 SPRK		
T		0.866	0.016		ALFF-STEI	66 SPRK		
T	572	0.90	0.06	0.05	AUERBACH	66 SPRK		8/67
T	4500	0.92	0.04		BALTAY	66 HBC		
T		0.904	0.024		BOTT-BODE	66 SPRK		
T	5000	0.843	0.013		KIRSCH	66 HBC		
T	*	0.862	0.016		HILL	67	PRELIMINARY	11/67
T		* * * * * * * *						
T	AVG	.8738	.0108	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)				
		(SEE IDEOGRAM)						

12 K01 PARTIAL DECAY MODES

P1	K01 INTO PI+ PI-	S 85 8
P2	K01 INTO PIO PIO	S 95 9
P3	K0S INTO MU+ MU-	S 45 4

12 K01 BRANCHING RATIOS

R1	*	K01 INTO (PI+ PI-)/TOTAL					(P1)/TOTAL	
R1		0.68	0.04		CRAWFORD	59 HBC		
R1		0.70	0.08		COLUMBIA	60 HBC		
R1	U	0.740	0.024		ANDERSON	62 HBC		
R1		* * * * * * * *						
R1	AVG	.6840	.0358	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				
R1	FIT	.684	.010	VALUE FROM CONSTRAINED FIT				
R2	*	K01 INTO (PIO PIO)/TOTAL					(P2)/TOTAL	
R2		0.27	0.11		CRAWFORD	59 HBC		
R2		0.26	0.06		BAGLIN	60 PBC		
R2		0.30	0.035		BROWN	61 XBC		
R2	1066	0.335	0.014		BROWN	63 XBC		
R2	198	0.288	0.021		CHRETIEN	63 PBC		
R2		* * * * * * * *						
R2	AVG	.3161	.0135	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)				
R2	FIT	.316	.010	VALUE FROM CONSTRAINED FIT				
		(SEE IDEOGRAM)						
R3	*	(K01 INTO PI+ PI- PIO)/(K02 INTO PI+ PI- PIO)						
R3		0.45	OR LESS		BEHR	66 HLBC	90 PER CT CONF	
R4	*	K0S INTO (MU+ MU-)/CHARGED (UNITS 10**-5)					(P3)/(P1)	
R4		10.0	OR LESS		BOTT-BODE	67 SPRK	90 PER CT CONF	8/67

REFERENCES
12 SHORT-LIVED NEUTRAL K (498, JP=C-) I=1/2

BOLDT 58 PRL 1 150 E BOLDT,D O CALDWELL,Y PAL ////////// MIT
CRAWFORD 59 PRL 2 266 CRAWFORD,CRESTI,COUGLASS,GOOD,TICHO +//LRL

BAGLIN 60 NC 18 1043 BAGLIN,BLOCH,BRISSON,PENNESSY + //PARIS EP
BIRGE 60 ROCH CONF 601 R W BIRGE,P P ELY + ////////// LRL+WISCONSIN
BOWEN 60 PR 119 2030 BOWEN,HARDY,REYNOLDS,SUN,PEARE+/PRINCE+BNL
COLUMBIA 60 ROCH CONF 727 M SCHWARTZ + ////////////////// COLUMBIA
MULLER 60 PRL 4 418 MULLER,BIRGE,FOWLER,GOOD,PICCIONI+/LRL+BNL

BROWN 61 NC 19 1155 BROWN,BRYANT,BURNSTEIN,GLASER,KADYK+//MICH
FITCH 61 NC 22 1160 V FITCH,P PIROUE,R PERKINS /// PRINCE+LASL
GOOD 61 PR 124 1223 GOOD,MAISEN,MULLER,PICCIONI + ////////// LRL
ANDERSON 62 CERN CONF 636 J A ANDERSON,F S CRAWFORD + ////////// LRL
BERTANZA 62 PREPRINT 0105 BERTANZA,CONNOLLY,GULWICK,EISLER + /// BNL
(BERTANZA UNPUBLISHED,BLT RECERTIFIED BY ALTHORS,AUGUST 66)
CRAWFORD 62 CERN CONF 827 F S CRAWFORD ////////////////////////// LRL

BROWN 63 PR 130 769 BROWN,KADYK,TRILLING,ROE + ///LRL+MICHIGAN
CHRETIEN 63 PR 131 2208 CHRETIEN+ //// BRANDEIS+BERCN+HARVARD+ MIT
KREISLER 64 PR 136 B 1074 M KREISLER,O OVERSETH,J CRONIN / PRINCETON
AUERBACH 65 PRL 14 192 AUERBACH,LANDE,MANN,SCIULLI,LTD + /// PENN
TRILLING 65 UCRL 16473 GEORGE H TRILLING //////////////////// LRL
TRILLING 65 IS UPDATED FROM 1965 ARGONNE CONF , PAGE 115

ALFF-STE 66 PL 21 595 ALFF-STEINBERGER,MEUER,KLEINKNECHT +//CERN
AUERBACH 66 PR 149 1052 ALERBACH,COBBS,LANDE,MANN,SCIULLI+/// PENN
SEE ALSO AUERBACH 65
BALTAY 66 PR 142 932 BALTAY,SANDWEISS,STONEHILL + /// YALE+BNL
BEHR 66 PL 22 540 BEHR,BRISSON,PETIAU+//EP,MILAN,PADUA,CRSAY
BOTT-BOD 66 BERKELEY CONF. BOTT-BODENHAUSEN,DE BOUARC + // CERN
KIRSCH 66 PR 147 939 L KIRSCH,P SCHMIDT /////////////// COLUMBIA

BOTT-BOD 67 PL 248 194 BOTT-BODENHAUSEN,DE BOUARC,CASSEL+ ///CERN
HILL 67 HEIDELBERG CONF HILL,ROBINSON,SAKITI+ ////// BNL,CARNEGIE

K^0_2

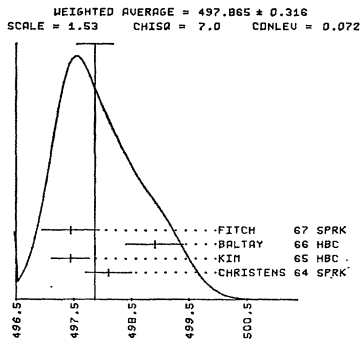
13 LONG-LIVED NEUTRAL K (498, JP=C-) I=1/2

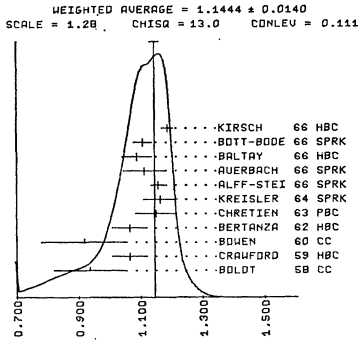
13 K02-K01 MASS DIFFERENCE (UNITS OF INVERSE K01 LIFE)

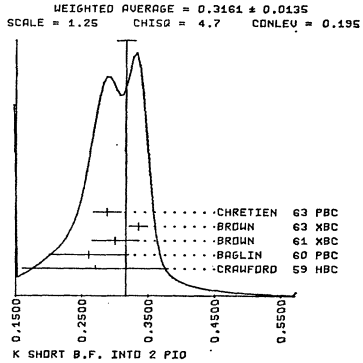
D	*	1.9	0.3		FITCH	61 CNTR		
D		0.84	0.29	0.21	GOOD	61 PBC		
D		0.88	0.20		CAMERINI	62 PBC	SEE NOTE C BELOW	8/67
D	C	VALUE CHANGED FROM 1.5 (SEE TABLE 1 OF CAMERINI 66)						8/67
D		0.47	0.21		AUBERT	65 PBC		
D		0.26	0.36	0.26	BALDO-CEC	65 PBC	ASS.CP CONS.	
D		0.55	0.1		CHRISTENS	65 SPRK		
D	*	0.60 OR LESS			FITCH	65 SPRK	CF. MEISNER 66	
D	G 130	0.82	0.14		VISHNEVSK	65 SPRK	CU AND AL REGEN	8/67
D		0.445	0.034		ALFF-STEI	66 SPRK		
D	84	0.36	0.21	0.31	BALDO-CEC	66 HLBC	K0+N INTC HYPER.	8/67
D		0.460	0.024		BOTT-BODE	66 SPRK		
D	77	0.50	0.15		CAMERINI	66 HBC, EBC	K0+N INTO HYPER	8/67
D	N 72	+ 0.54	0.15		CANTER	66 DBC	K0 SCATTER IN C2	11/66
D	N	ERROR IGNORES UNCERTAINTY OF PHASE SHIFTS						
D	95	0.54	0.09	0.14	CHANG	66 HBC	K0+P INTC HYPER.	8/67
D		0.72	0.15		FUJII	66 SPRK	IRON REGENERATOR	
D	C 89	0.62	0.16		HILL	66 DBC	K0+D INTC HYPER.	
D	C 136	0.67	0.15		CANTER	67 DBC	K0+D INTC HYPER.	11/67
D	C	CANTER 67 IS A PRELIMINARY RESULT,INCLUDES FILL 66 EVENTS						
D		+0.35	0.15		JOVANOVIC	66 SPRK	C+URANIUM REGEN.	11/66
D		+ 0.44	0.06		MEHLHOP	66 SPRK		
D	59	0.65	0.30		MEISNER 1	66 HBC	SEE NOTE M	
D	M	+ SIGN FAVORED			MEISNER 2	66 HBC		
D	600	0.53	0.10	0.11	GALANINA	67 SPRK	CU+AL REGENERAT.	11/67
D	G	GALINIA 67 IS A REANALYSIS OF VISHNEVSKY 65						
D		0.57	0.10		MISCHKE	67 SPRK		11/67
D		* * * * * * * *						
D	AVG	.4808	.0175	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

13 K02 LIFETIME (MICROSEC)

T	*	ASSUMED DS=DC AND DELTA I=1/2			CRAWFORD	59 HBC		
T	34	0.081	0.032	0.024	BARDON	58 CC		
T	15	0.051	0.024	0.013	DARDON	62 PBC		
T		0.053	0.006		FUJII	64 SPRK		8/67
T	1700	0.061	0.015	0.012	ASTBURY3	65 CC		8/67
T		0.0515	0.0014		DEVLIN	67 CNTR		8/67
T	L	0.050	0.005		LOWYS	67 HLBC	SEE NOTE L BELOW	8/67
T	L	SUM OF PARTIAL DECAY RATES						
T		* * * * * * * *						
T	AVG	.0520	.0014	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				
T	FIT	.053	.001	VALUE FROM CONSTRAINED FIT				







ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

STABLE PARTICLES

13 K02 PARTIAL DECAY MODES

P1	K02 INTO 3PIO	S 9S 9S 9
P2	K02 INTO PI+ PI- PIO	S 8S 8S 9
P3	K02 INTO PI MU NEUTRINO	S 8S 4S 2
P4	K02 INTO PI E NEUTRINO	S 8S 3S 1
P5	K02 INTO PI+ PI-	S 8S 8
P6	K02 INTO MU+ MU-	S 4S 4
P7	K02 INTO E+ E-	S 3S 3
P8	K02 INTO E MU	S 3S 4
P9	K02 INTO TWO GAMMAS	S 0S 0
P10	K02 INTO PI+ PI- GAMMA	S 8S 8S 0
P11	K02 INTO PIO PIO	S 9S 9

13 K02 DECAY RATES

W1	*	K02 INTO PIO PIO PIO			(UNITS 10**6 SEC-1) (P1)				
W1		54	5.22	1.03	0.84	BEHR	66 HLBC	ASSUMES CP	
W1			* * * * * * * * *						
W1	FIT		4.814	.405		VALUE FROM CONSTRAINED FIT			
W2	*	K02 INTO PI+ PI- PO			(UNITS 10**6 SEC-1) (P2)				
W2		18	3.26	0.77		ANDERSON	65 HBC		
W2		14	1.4	0.4		FRANZINI	65 HBC		
W2		136	2.62	0.28	0.27	BEHR	66 HLBC	ASSUMES CP	
W2			2.54	0.43		HILL	66 DBC		
W2			* * * * * * * * *						
W2	AVG		2.3573	.3207	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.7)				
W2	FIT		2.289	.093	VALUE FROM CONSTRAINED FIT				
					(SEE IDEOGRAM)				
W3	*	K02 INTO PI E NEUTRINO			(UNITS 10**6 SEC-1) (P4)				
W3			7.52	0.85	0.72	AUBERT	65 HLBC	DS=DQ,CP ASSUMED	8/67
W3			* * * * * * * * *						
W3	FIT		6.618	.292	VALUE FROM CONSTRAINED FIT				
W4	*	K02 INTO CHARGED (3-BODY)			(UNITS 10**6 SEC-1) (P2+P3+P4)				
W4		98	15.1	1.9		AUERBACH	66 SPRK		8/67
W4			* * * * * * * * *						
W4	FIT		14.057	.465	VALUE FROM CONSTRAINED FIT				
W5	*	K02 INTO LEPTONIC (KMU3+KE3) (UNITS 10**6 SEC-1) (P3+P4)							
W5		109	9.4	1.3		FRANZINI	65 HBC		
W5		54	11.3	1.9		GOLDEN	66 HBC		
W5		335	10.3	0.8		HILL	67 DBC	K+N TO KC P	8/67
W5			* * * * * * * * *						
W5	AVG		10.1949	.6413	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				
W5	FIT		11.767	.396	VALUE FROM CONSTRAINED FIT				
W6	*	K02 INTO PI MU NEUTRINO			UNITS 10**6 SEC-1) (P3)				
W6		19	4.54	1.24	1.02	LOWYS	67 HLBC		8/67
W6			* * * * * * * * *						
W6	FIT		5.149	.263	VALUE FROM CONSTRAINED FIT				

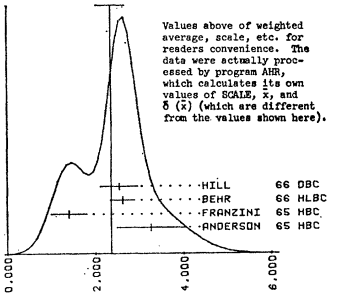
13 DECAY RATES DIFF.,(+)-(-)/(+)+(-) (PERCENT)

D1	*	K02 INTO MU+PI-NU - MU-PI+NU /MU+PI-NU + MU-PI+NL							
D1		10**6	0.403	C.134		DORFAN	67 SPRK	DERIVED FROM R16	11/67
D2	*	K02 INTO E+PI-NU - E-PI+NU /E+PI-NU + E-PI+NU							
D2		10**7	0.224	C.036		BENNETT	67 CNTR		11/67

13 K02 BRANCHING RATIOS

R1	*	K02 INTO (PIO PIC PIC)/CHARGED						(P1)/(P2+P3+P4)	
R1		24	0.24	C.C8		ANIKINA	64 CC		
R1			0.31	0.06		KULYUKINA	66 CC		
R1	*		0.248	0.035		ALBERT	67		11/67
R1	*		0.277	0.035		BEHR	67		11/67
R1			* * * * * * * * *						
R1	AVG		.2848	.0480	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				
R1	FIT		.342	.034	VALUE FROM CONSTRAINED FIT				
R2	*	K02 INTO (PI+ PI- PIO)/CHARGED						(P2)/(P2+P3+P4)	
R2		59	0.185	0.038		ASTIER	61 CC		
R2		79	0.151	0.020		ADAIR	64 HBC		
R2		75	0.157	0.03	0.04	LUERS	64 HBC		
R2		66	0.15	0.03	0.04	ASTBURY 1	65 CC		
R2		326	0.159	0.015		ASTBURY 2	65 CC		
R2		566	0.178	0.017		GUIDONI	65 HBC		
R2	*	1729	0.144	0.004		HOPKINS	65 HBC	SEE HOPKINS 67	
R2		126	0.162	0.015		HAWKINS	66 HBC		
R2		180	0.17	0.03		KULYUKINA	66 CC		
R2	*		0.154	0.020		AUBERT	67		11/67
R2			0.161	0.005		HOPKINS	67 HBC		8/67
R2			* * * * * * * * *						
R2	AVG		.1618	.0041	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				
R2	FIT		.163	.004	VALUE FROM CONSTRAINED FIT				
R3	*	K02 INTO (PI MU NEUTRINO)/CHARGED						(P3)/(P2+P3+P4)	
R3	C	251	0.356	0.07		LUERS	64 HBC		
R3	C	172	0.35	0.08	0.1C	ASTBURY 1	65 CC		
R3	C	330	0.32	0.07		KULYUKINA	66 CC		
R3	C	THIS MODE NOT MEASURED INDEPENDENTLY FROM R2 AND R4							
R3			* * * * * * * * *						
R3	FIT		.366	.014	VALUE FROM CONSTRAINED FIT				

WEIGHTED AVERAGE = 2.357 ± 0.321
SCALE = 1.65 CHISQ = 8.2 CONLEV = 0.042



K LONG RATE INTO PI+PI-PIO (10**6 SEC-1)

R4	*	K02 INTO (PI E NEUTRINO)/CHARGED						(P4)/(P2+P3+P4)	
R4		153	0.487	C.05		LUERS	64 HBC		
R4		202	0.46	0.08	0.1C	ASTBURY 1	65 CC		
R4		500	0.51	C.06		KULYUKINA	66 CC		
R4			* * * * * * * * *						
R4	AVG		.4908	.0353	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				
R4	FIT		.471	.014	VALUE FROM CONSTRAINED FIT				
R5	*	K02 INTO (PI E NEU)/((PI E NEU)+(PI MU NEU))						(P4)/(P3+P4)	
R5		320	0.415	0.120		ASTIER	61 CC		
R5			* * * * * * * * *						
R5	FIT		.562	.016	VALUE FROM CONSTRAINED FIT				
R6	*	K02 INTO(PI+ PI- PIO)/TOTAL						(P2)/TOTAL	
R6			* * * * * * * * *						
R6	FIT		.867	.022	VALUE FROM CONSTRAINED FIT				
R6	FIT		.867	.022	VALUE FROM CONSTRAINED FIT				
R7	*	K02 INTO(LEPTON PI NEUTRINO)/TOTAL						(P3+P4)/TOTAL	
R7			* * * * * * * * *						
R7	FIT		5.717	.149	VALUE FROM CONSTRAINED FIT				
R7	FIT		5.717	.149	VALUE FROM CONSTRAINED FIT				
R8	*	K02 INTO (2 GAMMA)/TOTAL			(UN. 10**-4)			(P9)/TOTAL	
R8	*		1.3	0.6		CRIEGEE	66 SPRK		
R8	*	33	7.4	1.6		CRONIN	67 SPRK		11/67
R8	*	NOT AVERAGED BECAUSE OF LARGE DISCREPANCY BETWEEN THE TWO EXPTS							
R9	*	K02 INTO (PI+ PI-)/CHARGED			(UNIT 10**-3)			(P5)/(P2+P3+P4)	
R9		45	2.0	0.4		CHRISTENS	64 SPRK		
R9		54	2.08	0.35		GALBRAITH	65 SPRK		
R9			1.93	0.26		BASILE	66 SPRK		
R9			1.953	0.080		BOTT-BODE	66 SPRK		
R9	D		2.22	0.27		DEKKERS	66 CNTR		
R9			2.12	0.18		DEBOUARD	67 SPRK	SEE NOTE D BELOW	11/67
R9	C	DEBOUARD 67 REPLACES DEKKERS 66							11/67
R9			1.97	0.16		FITCH	67 SPRK	ETA+-=1.91+-.06	11/67
R9			* * * * * * * * *						
R9	AVG		2.0041	.0626	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				
R10	*	K02 INTO (PI MU NEU)/(PI E NEU)						(P3)/(P4)	
R10			0.81	0.19		ADAIR	64 HBC		
R10	N		0.78	0.15		DE BOUARD	65 CNTR	SEE NOTE N BELOW	
R10	*		0.71	0.07		AUBERT	67		11/67
R10	*		0.76	0.14	0.08	BASILE	67		11/67
R10			0.82	0.10		DEBOUARD	67 SPRK	SEE NOTE N BELOW	11/67
R10	N	DEBOUARD 67 REPLACES DEBOUARD 65							
R10		273	0.7	0.2		HAWKINS	67 HBC		8/67
R10			0.81	0.08		HOPKINS	67 HBC		8/67
R10			* * * * * * * * *						
R10	AVG		.8043	.0569	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				
R10	FIT		.778	.051	VALUE FROM CONSTRAINED FIT				
R11	*	K02 INTO (MU+MU-)/CHARGED			(UNITS 10**-6)			(P6)/(P2+P3+P4)	
R11			100.0 OR LESS			ANIKINA	65 CC		
R11			50.0 OR LESS			ABASHIAN	66 SPRK	90 PER CT CONF	
R11			250.0 OR LESS			ALFF	66 SPRK	0.90 CONF. LEVEL	
R11			2.0 OR LESS			BOTT-BODE	67 SPRK	90 PER CT CONF	8/67
R12	*	K02 INTO (PI+ PI- GAMMA)/TOTAL (UNITS 10**-3) (P10)/TOTAL							
R12			15.0 OR LESS			ANIKINA	65 CC		
R12			5.0 OR LESS			BELLOTTI	66 HLBC		8/67
R12			3.0 OR LESS			NEFKENS	66 SPRK		
R13	*	K02 INTO (E+ E-)/CHARGED			(UNITS 10**-6)			(P7)/(P2+P3+P4)	
R13			1000.0 OR LESS			ANIKINA	65 CC		
R13			50.0 OR LESS			ABASHIAN	66 SPRK	90 PRCT CONF	
R13			200.0 OR LESS			ALFF	66 SPRK	90 PRCT CONF	
R13			23.0 OR LESS			BOTT-BODE	67 SPRK	90 PER CT CONF	8/67
R14	*	K02 INTO (E MU)/CHARGED			(UNITS 10**-4)			(P8)/(P2+P3+P4)	
R14			10.0 OR LESS			ANIKINA	65 CC		
R14			1.0 OR LESS			CARPENTER	66 SPRK	90 PER CT CONF	
R14			0.1C7 OR LESS			BOTT-BODE	67 SPRK	90 PER CT CONF	8/67
R15	*	K02 INTO(E+ PI- NEU)/(E- PI+ NEU)							
R15	C	97	0.90	0.18		NEAGU	61 CC		
R15	C		1.01	0.16		LUERS	64 HBC		
R15	C	89%	0.95	0.023		KULYUKINA	66 CC		
R15	C	1539	1.06	0.05		VERHEY	66 SPRK		8/67
R15	C	LOW PRECISION EXPTS NOT AVERAGED. FOR MORE PRECISE VALUE,							
R15	C	SEE S1302 (BENNETT 67)							
R16	*	K02 INTO(MU+ PI- NEU)/(MU- PI+ NEU)							
R16		3200	1.02	C.04		ABASHIAN	66 SPRK		
R16		10**6	1.0081	0.0027		DORFAN	67 SPRK		11/67
R17	*	K02 INTO (PIC PIO)/TOTAL (UNITS 10**-3) (P11)/TOTAL							
R17	C	7	1.2	1.5	1.2	CRIEGEE	66 SPRK		
R17	C	CRIEGEE EXPT NOT DESIGNED TO MEASURE 2 PIO DECAY MODE							
R17		87	3.3	1.8	1.1	GAILLARD	67 SPRK	KS REGENER.IN CA	8/67
R17	*	GAILLARD 67 QUOTES ETA CO = 4.3(+1.1,-C.8) UNITS 10**-3							
R18	*	K02 INTO (3PIO)/(PI+PI-PIO)						(P1)/(P2)	
R18		188	2.0	0.6		ALEKSANYA	64 FBC		
R18	*		1.73	0.20		BUDAGOV	67		11/67
R18			* * * * * * * * *						
R18	FIT		2.103	.214	VALUE FROM CONSTRAINED FIT				
R19	*	KOL INTO (2PIO)/(3PIO)			(UNITS 10**-2)			(P11)/(P1)	
R19	C	109	1.85	0.31		CRONIN 1	67 SPRK	ETAOO=4.5+-0.5	8/67
R19	C		1.36	C.18		CRONIN 2	67 SPRK	ETAOO=3.92+-0.3	11/67
R19	C	CRONIN 2 IS PRELIM RESULT FROM FURTHER ANALYSIS OF CRONIN 1							11/67

13 K02 FORM FACTORS 8/67

LM+ * LAMBDA + (LINEAR ENERGY DEPENDENCE OF F+ IN KC E3 DECAY) 8/67

LM+ * FOR RAD. CORR. TO THE DALITZ PLOT OF KE3, SEE GINSBERG 67.

LM+	*	153	+0.07	.06		LUERS	64 DLTZ PLT,NC RAD CORR	
LM+	*		+0.15	.08		FISHER	65 SPARK DLTZ PLT,NC RAD CORR	8/67
LM+	*		0.023	0.017		BASILE	67 SPRK	11/67
LM+	*	762	-0.01	.02		FIRESTONE	67 FBC DLTZ PLT,NO RAD CORR	8/67
LM+	*	531	+0.01	.015		KADYK	67 FBC E,PI SPEC,NC RAD CCR	8/67
LM+	*	240	+0.08	.10	.08	LOWYS	67 FBC PIC SPEC,NO RAD CORR	8/67

XIA * XIA = F-/F+ (DETERMINED FROM SPECTRA AND KMU3/KE3)

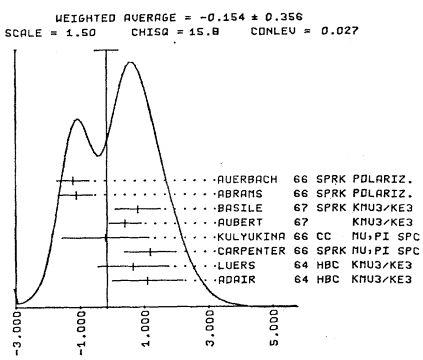
XIA	*	389	+1.1	0.9	1.3	ADAIR	64 FBC	KMU3/KE3 8/67
XIA	*		+0.66	0.9	1.3	LUERS	64 HBC	KMU3/KE3 8/67
XIA	*	1371	+1.2	0.8		CARPENTER	66 SPRK	MU,PI SPECTRA 8/67
XIA	C	1371	-0.82	0.6		CARPENTER	66 SPRK	MU,PI SPECTRA 8/67
XIA	C	2ND CARPENTER VALUE ALLOWS ENERGY DEP OF F+,F-						
XIA	*		-0.2	1.0	1.7	KULYUKINA	66 CC	MU,PI SPECTRA 8/67
XIA	*		0.4	0.5		AUBERT	67 +	KMU3/KE3 11/67
XIA	*		0.8	0.7		BASILE	67 SPRK +	KML3/KE3 11/67

XIB * XIB = F-/F+ (DETERMINED FROM ML POLARIZATION IN KML3)

XIB	*		-1.1	0.5		ABRAMS	66 SPRK	POLARIZATION 8/67
XIB	*	2608	-1.2	0.5		AUERBACH	66 SPRK	POLARIZATION 8/67

XIB * MEAS OF XI USING POLARIZATION IS LESS SENSITIVE TO FORM FACTOR
XIB * VARIATIONS AND PROBABLY GIVES A BETTER EXPERIMENTAL VALUE
(SEE IDEOGRAM)

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.



F-/F+ FOR KO DECAY (BOTH XIA AND XIB)

13 X =(CS=-EQ AMPLITUDE /CS=+EQ AMPLITUDE)

REX * REAL PART OF X

REX	152	0.06	0.18	0.44	BALDO-CE 65 HLBC	K+ CHARGE EXCHNG		11/67
REX *		BALDO-CE 65 GIVES X AND THETA.CONVERTED BY LS TO REX AND IMX						11/67
REX	196	0.035	0.11	0.13	ALBERT 65 HLBC	K+ CHARGE EXCHNG		11/67
REX	109	-0.08	0.16	0.28	FRANZINI 65 HBC	PBAR P		11/67
REX *		FRANZINI 65 GIVES X AND THETA.FOR REX AND IMX SEE SCHMIDT 67						11/67
REX	335	0.17	0.10		HILL 67 DBC	K+D YIELDS KOPP		11/67
REX	116	0.17	0.16	0.35	FELDMAN 67 SPRK	PI-P TO KO LMBDA		11/67
REX		* * * * * * * *						
REX AVG		.0573	.0681	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

IMX * IMAGINARY PART OF X (USE CONVENTION THAT M(KS)-M(KL) POSITIVE)

IMX	152	0.44	0.19	0.32	BALDO-CE 65 HLBC	K+ CHARGE EXCHNG		11/67
IMX *		BALDO-CE 65 GIVES X AND THETA.CONVERTED BY LS TO REX AND IMX						11/67
IMX	196	0.21	0.15	0.11	ALBERT 65 HLBC	K+ CHARGE EXCHNG		11/67
IMX	109	-0.24	0.30	0.40	FRANZINI 65 HBC	PBAR P		11/67
IMX *		FRANZINI 65 GIVES X AND THETA.FOR REX AND IMX SEE SCHMIDT 67						11/67
IMX	116	0.0	0.25		FELDMAN 67 SPRK	PI-P TO KO LMBDA		11/67
IMX	335	0.20	0.10		HILL 67 DBC	K+D YIELDS KOPP		11/67
IMX		* * * * * * * *						
IMX AVG		.1874	.0703	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

13 CP VIOLATION PARAMETERS
ETA+- = A(KL TO PI+PI-)/A(KS TO PI+PI-)
ETA00 = A(KL TO PI0PI0)/A(KS TO PI0PI0)
THE MAGNITUDES OF ETA+- AND OF ETA00 ARE DERIVED FROM BR. RATIOS.
FOR VALUES OF MAGNITUDE(ETA+-) QUOTED BY INDIVIDUAL EXPTS, SEE LISTINGS OF S13R9. FOR MAGNITUDE OF ETA00,SEE S13R17,S13R19.

F+- * PHASE OF ETA +- (DEGREES)

F+- *	45.0	50.0	FITCH 65 SPRK	BE REGEN			11/67
F+- *	39.0	45.0	FIRESTONE 66 HBC				11/67
F+-	60.0	17.0	BOHM 67 SPRK	VACUUM REGEN			11/67
F+-	70.0	21.0	BOTT-BODE 67 SPRK	C REGEN			11/67
F+-	84.0	17.0	RUBBIA 67 SPRK	CU REGEN			11/67
F+-	25.0	25.0	MISCHKE 67 SPRK	CU REGEN			11/67
F+-	* * * * * * * *						
F+- AVG	64.6089	11.0485	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)				

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REFERENCES
13 LONG-LIVED NEUTRAL K (498, JP=0-) I=1/2

BARDON 50 ANP 5 156	M BARDON,K LANDE,L LEDERMAN //CGLUMBIA+BNL		
CRAWFORD 59 PRL 2 361	CRAWFORD,GRESTI,DOUGLASS,GCCD + ////// LRL		
ASTIER 61 AIX CONF 1 227	ASTIER,BLASKOVIC,RIVET,SIALC +/// PARIS+EP		
FITCH 61 NC 22 1160	V FITCH,P PIRQUE,R PERKINS ///// PRINCETON		
GOOD 61 PR 124 1223	GCOD,MAISEN,MULLER,PICCIONI,FOWELL +// LRL		
NEAGU 61 PRL 6 552	NEAGU,OKONOV,PETROV,ROSANCVA,RUSAKOV//JINR		
ALEXANDE 62 PRL 9 69	G ALEXANDER,S ALMEIDA,F CRAWFORD ///// LRL		
CAMERINI 62 PR 126 362	CAMERINI,FRY,GAICOS,BIRGE,ELY +///WISC+LRL		
DARMON 62 PL 3 57	J DARMON,A ROUSSET,J SIX ////////PARIS+EP		
JOVANOVI 62 BNL CONF 42	JCVANCVIC,FISCHER,BURRIS + // BNL+MARYLANC		
ADAIR 64 PL 12 67	R K ADAIR,L B LEIPUNER /////////// YALE+BNL		
ALEKSANY 64 DUBNA 2 102	ALEKSANYAN,ALIKHANYAN,VARTAZARYAN+//EREVAN		
SEE ALSO JETP 19 1019	ALEKSANYAN+/// LEBEDEV+MCS ENG PHYS+EREVAN		
ANIKINA 64 JETP 19 42	ANIKINA,ZHURAVLEVA+//GEORG ACAD SCI+ DUBNA		
CHRISTEN 64 PRL 13 138	CHRISTENSCN,CRONIN,FITCH,TURLAY //PRINCETN		
FUJII 64 DUBNA 2 146	FUJII,JOVANOVICH,TURKOT+//BNL,MARYLANC,MIT		
LUERS 64 PR 133 B 1276	LUERS,MITTRA,WILLIS,YAMAMCTC /////////// BNL		
STERN 64 PRL 12 459	STERN,BINFORC,LINC,ANDERSCN + /// WISC+LRL		
ANIKINA 65 JINR P 2488	ANIKINA,VARDENGA,ZHURAVLEVA,KCTLYA+//DUBNA		
ANDERSON 65 PRL 14 475	ANDERSON,CRAWFORD,GOLDEN,STERN +//LRL+WISC		
ASTBURY1 65 PL 16 80	ASTBURY,FINOCCHIARO,BEUSCH + / CERN+ZLRICH		
ASTBURY1 65 SEE ALSC M PEPIN	FELV.PHYS. ACTA 39 523		
ASTBURY2 65 PL 18 175	ASTBURY,MICHELINI,BEUSCH + /// CERN+ZLRICH		
ASTBURY3 65 PL 18 178	ASTBURY,MICHELINI,BEUSCH + /// CERN+ZLRICH		
AUBERT 65 PL 17 59	ALBERT,BEHR,CANAVAN,CHOLNET+///PARIS+CRSAY		
AUBERT 65 SEE ALSC LOWYS 67			
BALCO-CE 65 NC 38 684	BALCO-CEGLIN,CALIMANI,CIAMPCLILLO + /PADVA		
BEHR 65 ARGONNE CONF 59	BEHR,ERISSON,BELLOTTI+ // EP+MILANO+PADOVA		
CHRISTEN 65 PR 140 B 74	CHRISTENSON,CRONIN,FITCH,TURLAY//PRINCETON		
(CHRISTENSON 65 HAS BEEN CORRECTED FOR INTERFERENCE BY FITCH 65, FOOTNOTE)			
DE BOUAR 65 PL 15 58	DE BOLARD,DEKKERS,SCHARFF+//CERN+ORSAY+MPI		
FISHER 65 ANL 7130 83	FISHER,ABASHIAN,ABRAMS,CARPENTER+/ILLINOIS		
FITCH 65 PRL 15 73	FITCH,ROTH,RUSS,VERNON ///////// PRINCETON		
FRANZINI 65 PR 140 B 127	FRANZINI,KIRSCH,PLANO + / CCLUMBIA+RUTGERS		
GALBRAIT 65 PRL 14 383	GALBRAITH,MANNING,JONES +//AERE+BRIST+RHEL		
GUIDONI 65 ARGONNE CONF 49	+BARNES,FOELSCHE,FERBEL,FIRESTO+//BNL+YALE		
HOPKINS 65 ARGONNE CONF 67	H W K HOPKINS,BACON,EISLER // VANC+RUTGERS		
MESTVIRI 65 JINR P 2449	MESTVIRISHVILI,NYAGU,PETRCV,RUSAKOV+//JINR		
TRILLING 65 UCRL 16473	GEORGE H TRILLING ////////////////////// LRL		
TRILLING 65 IS UPDATED FROM	1965 ARGONNE CONF, PAGE 115		
VISHNEVS 65 PL 18 339	VISHNEVSKY,GALANINA,SEMENCV + ///// MCSCOW		
ABASHIAN 66 BERKELEY 2B	ABASHIAN,ABRAMS,VERHEY+ // URBANA		
ABRAMS 66 BERKELEY CONF 2B	ABRAMS ABASHIAN,CARPENTER+ ////// ILLINOIS		
ALFF-STE 66 PL 21 595	ALFF-STEINBERGER,HEUER,KLEBIA + // CERN		
AUERBACH 66 PRL 17 980	ALERBACH,MANN,MCFARLANE,SCILLI ///// PENN		
AUERBACH 66 PR 149 1052	ALERBACH,COBBS,LANDE,MANN,SCIULLI+/// PENN		
AUERBACH 66 SEE ALSC PRL 14 192			
BALATZ 66 BERKELEY 2B	BALATZ,BEREZIN,VISNEVSKY,GALANINA+//MCSCOW		
BALCO-CE 66 NC 45A 733	BALCO-CEGLIN,CALIMANI,CIAMPCLILLO+///PADUA		
BASILE 66 BALATON CONF	BASILE,CRONIN,THEVENET + // SACLAY		
BEHR 66 PL 22 540	BEHR,BRISSON,BALCO-CEGLIN,ALBERT+/PADLA,EP		
BELLOTTI 66 NC 45A 737	BELLOTTI,PULLIA,BALDO-CEGLIN+ /MILAN,PADUA		
BOTT-BCE 66 PL 23 277	BCTT-BODENHAUSEN,DE BOUAR,CASSEL+ // CERN		
CAMERINI 66 PR 150 1148	CAMERINI,CLINE,ENGLISH,FISCHBEIN+WISCNSIN		
CANTER 66 PRL 17 942	+CHO,ENGLER,FISK,HILL + // CARNEGIE+BNL		
CARPENTE 66 PR 142 871	CARPENTER,ABASHAN,ABRAMS,FISHER///ILLINOIS		
CHANG 66 PL 23 702	CHANG,BASSANO,KIKUCHI,DODE+// SYRACUSE,BNL		
CRIEGEE 66 PRL 17 150	+FOX,FRAUENFELDER,HANSON,MCSCAT+//ILLINOIS		
DEKKERS 66 THESIS BRUSSELS	D DEKKERS + ////////////////////////// CERN		
FIRESTCN 66 PRL 16 556	FIRESTONE,KIM,LACH,SANDWEISS+/////YALE,BNL		
FIRESTON 66 PRL 17 116	FIRESTONE,KIM,LACH,SANDWEISS+/////YALE,BNL		
FUJII 66 PRL 13 253	FUJII,JOVANOVICH,TURKOT,ZORN//BNL+MARYLAND		
(FUJII 66 IS THE CORRECTED	VALUE GIVEN BY JCVANOVICH+ 66)		
GOLDEN 66 BERKELEY ZB	R.GOLDEN,F.CRAWFORD,O.STERN // LRL		
HAWKINS 66 PL 21 238	C J B HAWKINS ////////////////////////// YALE		
ALSO 67 PR 156 1444	C J B HAWKINS ////////////////////// YALE		
HILL 66 BNL 10608	HILL,ROBINSON,SAKITT,CANTER+//BNL,CARNEGIE		
JOVANOVI 66 PRL 17 1075	JCVANCVICH,FUJII,TURKOT,ZORN +//BNL+MC+MIT		
KULYUKIN 66 BERKELEY 2B	KULYUKINA,MESTVIRISHVILI,NEAGU,PETR+//JINR		
MEISNER1 66 PRL 16 278	G W MEISNER,B B CRAWFORD,F CRAWFORD // LRL		
MEISNER2 66 PRL 17 492	G MEISNER,B CRAWFORD,F CRAWFORD ////// LRL		
MEHLHOP 66 BERKELEY CONF.	MEHLHOP,GCOD,PICCIONI + // LA JOLLA		
MISCHKE 66 BERKELEY CONF.	+ ABASHIAN,ABRAMS,CARPENTER + // ILLINOIS		
NEFKENS 66 PL 19 706	NEFKENS,ABASHIAN,ABRAMS,CARPENTER+ /// ILL		
VERHEY 66 PRL 17 669	VERHEY,NEFKENS,ABASHIAN+// URBANA		
AUBERT 67 HEIDELBERG CONF	ALBERT,FREUSS,LEECNG,NAGY,PASCAUC /// CRSAY		
BASILE 67 HEIDELBERG CONF	BASILE,CRONIN,THEVENET,TURLAY+ //// SACLAY		
BEHR 67 HEIDELBERG CONF	BEHR,BEILLIERE,BCUTANG,VANDERVERLDE/////EP		
BENNETT 67 PRL 19 993	BENNETT,NYGREN,SAAL,STEINBERGER +/COLUMBIA		
BOHM 67 HEIDELBERG CONF	BCHM,CARRIULAT,GROSSG,KAFTANCV ////// CERN		
BOTT-BOC 67 PL 24B 194	BCTT-BODENHALSEN,DEBOUARC,CASSEL + ///CERN		
BOTT-BOC 67 PL 24B 438	BCTT-BODENHAUSEN,DEBOUARC,DEKKERS+////CERN		
ALSC 66 PL 20 212	BCTT-BODENHAUSEN,DEBOUARC,CASSEL+/////CERN		
ALSC 66 PL 23 277	BCTT-BODENHAUSEN,DEBOUARC,CASSEL+/////CERN		
BUDAGOV 67 HEIDELBERG CONF.	BLDAGOV,BURMEISTER,CUNDY,KRENZ,MYATT+/CERN		
CANTER 67 HEIDELBERG CONF	CANTER,CHO,DRALLE,ENGLER+ /// CARNEGIE,BNL		
CRONIN 1 67 PRL 18 25	+KUNZ,RISK,WHEELER/////////////PRINCETCN		
CRONIN 2 67 PRINC CONF(11/67)	+KUNZ,RISK,WHEELER /////////////// PRINCETCN		
DEBOUARC 67 NC TO BE PUB	DEBOUARC,DEKKERS,SCHARFF+///CERN+ORSAY+MPI		
DEVLIN 67 PRL 18 54 .	DEVLIN,SOLOMON,SHEPARD,BEALL+//PRINC+MARY.		
DORFAN 67 PRL 19 987	DORFAN,ENSTROM,RAYMOND,SCHWARTZ +/SLAC+LRL		
FELDMAN 67 PR 155 1611	FELDMAN,FRANKEL,FIGHLANC,SLCAN //U OF PENN		
FIRESTCN 67 PRL 18 176	FIRESTONE,KIM,LACH,SANDWEISS,+////YALE,BNL		
FITCH 67 NC TO BE PUB	FITCH,ROTH,RUSS,VERNON ///////// PRINCETON		
GAILLARD 67 PRL 18 20	+KRIENEN,GALBRAITH,HUSSRI+//CERN+RUTH+AACH		
GINSBERG 67 PR 162 1570	EDWARD S GINSBERG ////////// L. MASS BCSTON		
HAWKINS 67 PR 156 1444	C J B HAWKINS ////////////////////// YALE		
HILL 67 PRL 19 668	HILL,LUERS,ROBINSON,CANTER+///BNL,CARNEGIE		
HOPKINS 67 PRL 19 185	HOPKINS,BACON,EISLER ////////////////// BNL		
KADYK 67 PRL 19 597	KADYK,CHAN,ERICSON,ORFN,SHELDON ////// LRL		
LOWYS 67 PL 24B 75	LOWYS,ALBERT,CHOLNET,PASCALC+/////EP,CRSAY		
MISCHKE 67 PRL 18 138	MISCHKE,ABASHIAN,ABRAMS+////////// ILLINOIS		
RUBBIA 67 PL 24B 531	C.RUBBIA,J.STEINBERGER////////////// CERN+COL		
ALSO 66 PL 20 207	ALFF-STEINBERGER,HEUER,KLEINKNECHT+///CERN		
ALSO 66 PL 21 555	ALFF-STEINBERGER,HEUER,KLEINKNECHT+///CERN		
ALSO 66 PL 23 167	C.RUBBIA,J.STEINBERGER ////////////CERN+COL		
SCHMIDT 67 NEVIS 160(THESIS)	P. SCHMIDT ////////////////////////// COLUMBIA		

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η

14 ETA (549,JPG=0-+) I=C

14 ETA MASS (MEV)

M	53	549.0	1.2	BASTIEN	62 HBC	
M	35	546.0	4.0	PICKUP	62 HBC	
M	91	548.0	1.0	ALFF	62 HBC	
M		549.3	2.9	DELCOURT	63 CNTR	
M	148	549.0	0.7	FOELSCHE	64 HBC	
M	325	552.0	3.0	KRAEMER	64 DBC	
M		548.2	0.65	FOSTER3	65 HBC	
M	250	555.0	2.0	JAMES	66 HBC	
M		* * * * * * * *				
M AVG		548.8176	.5570	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)		

14 ETA WIDTH (MEV)

W	91	10.0	CR LESS	ALFF	62 HBC		
W	148	10.0	CR LESS	FOELSCHE	64 HBC		
W	31	12.0	CR LESS	JAMES	66 HBC		
W		4.0	CR LESS	BALTAY	66 DBC		
W		.9	CR LESS	JONES	66 CNTR	.95 CONF.LEVEL	8/67

14 ETA PARTIAL DECAY MODES

P1	ETA INTO 2GAMMA	S 0S 0
P2	ETA INTO 3PIC	S 9S 9S 9
P3	ETA INTO PI+ PI- PIO	S 8S 8S 9
P4	ETA INTO PI+ PI- GAMMA	S 8S 8S 0
P5	ETA INTO E+E-PIO VIOLATES C IN E.M.I.	S 9S 3S 3
P6	ETA INTO E+E-PI+PI-	S 8S 8S 3S 3
P7	ETA INTO PIO 2GAMMA	S 9S 0S 0
P8	ETA INTO E+E-GAMMA	S 3S 3S 0
P9	ETA INTO 2PIO GAMMA VIOLATES C	S 9S 9S 0
P10	ETA INTO PI+PI-PIO GAMMA	S 8S 8S 9S 0
P11	ETA INTO PI+PI- 2GAMMA	S 8S 8S 0S 0

14 ETA DECAY RATES

W1 *	ETA INTO 2GAMMA (UNITS KEV)			(P1)	
W1	0.93	0.2	BEMPORAC 67 CNTR	PRIMAKOFF EFFECT	11/67
*	ASSUMES THAT 2GAMMA/TOTAL =0.41+/- 0.02				

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

STABLE PARTICLES

Eta decay into neutrals

If we use all of the data in the card listings in our constrained fitting program, we find that the overall eta-decay fit has $\chi^2/\langle\chi^2\rangle$ of 59/27, which corresponds to a confidence level of $\sim 10^{-4}$! The difficulty is that there have recently been reported some new results from experiments on etas decaying into neutrals which seriously disagree with the set of older data on these modes. These experiments are:

"Old" experiments	"New" experiments
DiGiugno 66	Buniatov 67
Grunhaus 66	Baltay1 67
Feldman 67	Jacquet 67
Bacci 63	
Muller 63	

The primary difference between these two sets is that the newer experiments all give $\eta \to \pi^0\gamma\gamma \approx 0$, whereas the older experiments gave $\eta \to \pi^0\gamma\gamma \approx 20\%$.

If we delete either the "old" data or the "new" data, we find $\chi^2 \approx \langle\chi^2\rangle$, and thus reasonable probabilities. The results of these fits are as follows:

Mode	Using "new" data	Using "old" data
$\gamma\gamma$	0.42±.02	0.34±.02
$\pi^0\gamma\gamma$	0.01±.02	0.19±.03
$3\pi^0$	0.28±.03	0.18±.03
$\pi^+\pi^-\pi^0$	0.24±.01	0.23±.01
$\pi^+\pi^-\gamma$	0.06±.005	0.05±.005

We thus cannot quote meaningful central values or errors on the neutral modes at this time. However, it seems reasonable that the final central values for these modes will lie between the two extremes listed above, once the inconsistancies among the various experiments are finally resolved.

14 ETA BRANCHING RATIOS

(P9) IS ASSUMED = 0 IN ALL RATIOS

```
R1  *    ETA.INTO NEUTRALS/CHARGED                          (P1+P2+P7)/(P3+P4)
R1  N   10     2.5       1.0          PICKUP     62 HBC
R1  N   53     3.20      1.26         BASTIEN    62 HBC
R1  N          2.7       0.8          SHAFER     62 HBC
R1             2.6       .9           BLSCHBECK  63 HBC
R1  N  280     4.5       1.0          JAMES      66 HBC
R1  N     THIS EXPERIMENT HAS NOT BEEN USED IN COMPUTING THE AVERAGES
R1  N  AS IT WAS UNABLE TO CLEARLY SEPARATE PARTIAL MODES (3) AND (4)
R1  N  FROM EACH OTHER.  THE REPORTED VALUE THUS PROBABLY CONTAINS
R1  N  SOME (UNKNOWN) FRACTION OF MODE (4), AS POINTED OUT BY E.C. FOWLER
R1          2.64      0.23         BALTAY2    67 DBC                          11/67
R1       . . . . . . . . .
R1  AVG     2.6375    .2228    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R1  FIT     2.465     .161     VALUE FROM CONSTRAINED FIT

R2  *  ETA INTO 2GAMMA/CHARGED                                    (P1)/(P3+P4)
R2          0.99      0.48         CRAWFORD   63 HBC
R2       . . . . . . . . .
R2  FIT     1.281     .110     VALUE FROM CONSTRAINED FIT

R3  *     ETA INTO PIC 2GAMMA/NEUTRALS                           (P7)/(P1+P2+P7)
R3          0.375     0.072        DIGIUGNO   66 CNTR     ERROR DOUBLED
R3  *     THE ERRORS OF DIGIUGNO+ 66 HAVE BEEN INCREASED BY A FACTOR
R3  *  OF TWO, TO TAKE INTO ACCOUNT POSSIBLE SYSTEMATIC ERRORS, AS
R3  *  SUGGESTED BY THE AUTHORS.
R3             .27       .10          GRUNHAUS   66 SPRK                     .8/67
R3             .244      .05          FELDMAN    67 SPRK                     8/67
R3             .028      .044         BUNIATOV   67 SPRK                     11/67
R3       . . . . . . . . .
R3  AVG     .1748     .0773    AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.7)
R3  FIT     .142      .047     VALUE FROM CONSTRAINED FIT
                 (SEE IDEOGRAM)
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R4  *  ETA INTO (PI+ PI- GAMMA)/(PI+ PI- PIO)                    (P4)/(P3)
R4          0.14      0.08         FCELSCHE   64 HBC
R4  M  24   0.73      0.25         PAULI      64 DBC
R4  M     THIS EXPERIMENT HAS NOT BEEN INCLUDED IN THE AVERAGES SINCE
R4  M  IT IS NOT CLEAR THAT THEIR CLASS B EVENTS ARE ACTUALLY FROM ETAS.
R4          0.30      0.06         CRAWFORD   66 HBC
R4           .10       .10         KRAEMER    64 DBC
R4           .196      .041        FOSTER3    65 HBC
R4           .25       .035        LITCHFIEL  67 DBC                          8/67
R4          0.28      0.04         BALTAY2    67 DBC                          11/67
R4       . . . . . . . . .
R4  AVG     .2377     .0229    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
R4  FIT     .235      .021     VALUE FROM CONSTRAINED FIT

R5  *    ETA INTO (3PIO + 2/3 PIO 2GAMMA)/ PI+PI-PIO          (P2+2/3P7)/P3
R5          0.83      0.32         CRAWFORD   63 HBC
R5          2.0       1.0          FCELSCHE   64 HBC
R5          0.90      0.24         FOSTER1    65 HBC
R5       . . . . . . . . .
R5  AVG     .9148     .1886    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R5  FIT     1.318     .109     VALUE FROM CONSTRAINED FIT

R6  *  ETA INTO 3PIO/2GAMMA                                        (P2)/(P1)
R6          .90  CR MORE         CHRETIEN   62 PBC
R6  P       0.42  CR LESS        STRUGALSK  67 HBC  PRELIMINARY REPORT   4/67
R6          0.88      0.16         BALTAY1    67 DBC                          11/67
R6       . . . . . . . . .
R6  FIT     .651      .103     VALUE FROM CONSTRAINED FIT

R7  *  ETA INTO 2GAMMA/(PI+ PI- PC)                               (P1)/(P3)
R7          1.61      0.39         FCSTER1    65 HBC
R7       . . . . . . . . .
R7  FIT     1.581     .137     VALUE FROM CONSTRAINED FIT

R8  *    ETA INTO NEUTRAL/(PI+ PI- PIC)                      (P1+P2+P7)/(P3)
R8     280  3.6       0.8          KRAEMER    64 DBC
R8          3.8       1.1          PAULI      64 DBC
R8          2.89      0.56         ALFF-STEI  66 HBC
R8       . . . . . . . . .
R8  AVG     3.2237    .4234    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R8  FIT     3.043     .200     VALUE FROM CONSTRAINED FIT

R9  *  ETA INTO  (E+E-PIO)/(PI+PI-PIO)  (UNITS 10**-2)  (P5)/(P3)
R9          1.1   CR LESS        PRICE      65 HBC
R9       0  0.77  CR LESS        FCSTER2    65 HBC
R9          .42   CR LESS        BAGLIN1    67 HLBC     .9 CONF.LEVEL    8/67
R9       0  .16   CR LESS        BILLING    67 HLBC     .9 CONF.LEVEL    11/67

R10 *    ETA INTO (E+E-PI+PI-)/TOTAL  (UNITS 10**-2)      (P6)/TOTAL
R10         0.7 OR LESS          RITTENBER  65 HBC

R11 *    ETA INTO (E+E-PI+PI-)/(PI+PI-GAMMA)                 (P6)/(P4)
R11    1    0.026     0.026        GROSSMAN   66 HBC

R12 *    ETA INTO 2 GAMMA/NEUTRALS                           (P1)/(P1+P2+P7)
R12         0.416     0.044        DIGIUGNO   66 CNTR     ERROR DOUBLED
R12          .44       .07         GRUNHAUS   66 SPRK                     8/67
R12          .579      .052        FELDMAN    67 SPRK                     8/67
R12 T       0.35      0.06         JONES      66 CNTR                     8/67
R12 T  THIS RESULT FROM COMBINING CROSS-SECTIONS FROM THE DIFFERENT EXPTS.
R12          .59       .033        BUNIATOV   67 SPRK                     11/67
R12       . . . . . . . . .
R12 AVG     .5280     .0456    AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.0)
R12 FIT     .520      .027     VALUE FROM CONSTRAINED FIT
                 (SEE IDEOGRAM)

R13 *    ETA INTO 3PIC/NEUTRALS                              (P2)/(P1+P2+P7)
R13 R       0.209     0.054        DIGIUGNO   66 CNTR     ERROR DOUBLED
R13 R        .25       .10         GRUNHAUS   66 SPRK                     8/67
R13 R        .177      .035        FELDMAN    67 SPRK                     8/67
R13 R        .41       .033        BUNIATOV   67 SPRK                     11/67
R13 R RECUNCANT INFORMATION FROM THIS EXPERIMENT
R13      . . . . . . . . .
R13 FIT     .338      .045     VALUE FROM CONSTRAINED FIT

R14 *      ETA INTO PIO 2GAMMA/2GAMMA                          (P7)/(P1)
R14          .5  CR LESS        WAHLIG     66 SPRK     .9 CONF LEVL
R14 P       0.86      0.47         STRUGALSK  67 HBC  PRELIMINARY REPORT   4/67
R14         0.0       0.14         BALTAY1    67 DBC                          11/67
R14 *       0.05      C.04         BCNAMY     67 SPRK                     11/67
R14      . . . . . . . . .
R14 FIT     .274      .097     VALUE FROM CONSTRAINED FIT

R15 *      ETA INTO (E+E-PIO)/TOTAL (UNITS 10**-2)          (P5)/TOTAL
R15         0.7 OR LESS          RITTENBER  65 HBC
R15         0.13  CR LESS        BAZIN      67 DBC                          11/67

R16 *    ETA INTO 2GAMMA/(3PIO + PIC 2GAMMA)                 (P1)/(P2+P7)
R16         0.80      .25          BACCI      63 CNTR
R16      . . . . . . . . .
R16 FIT     1.082     .114     VALUE FROM CONSTRAINED FIT

R17 *    ETA INTO (PI+PI-PIO GAMMA)/(PI+PI-PIC)              (P10)/(P3)
R17          .07  CR LESS        FLATTE     67 HBC                      8/67
R17          .009 CR LESS        PRICE      67 HBC                      8/67
R17          .016 CR LESS        BALTAY2    67 DBC     .95 CONF LEVL    11/67
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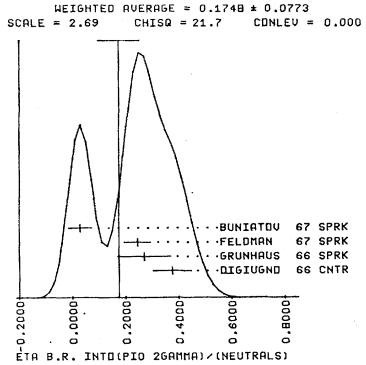

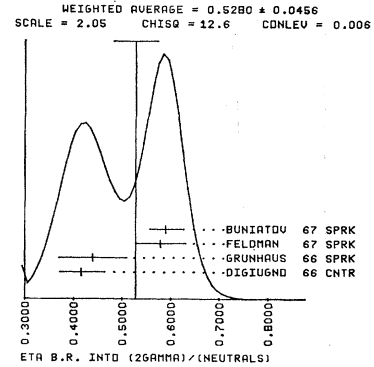

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED

STABLE PARTICLES

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R18 *    ETA INTO (PI+PI- 2GAMMA)/(PI+PI-PIO)                (P111)/(P3)
R18          .009 CR LESS          PRICE     67 HBC                    8/67
R18          .016 CR LESS          BALTAY2   67 DBC     .95 CONF LEVL  11/67
R19 *    ETA INTO 3PIO/(PI+ PI- PIO)                          (P2)/(P3)
R19         1.05      .25          MICHAEL   67 HLBC                   8/67
R19         1.3       .4           BAGLIN2   67 HLBC                   8/67
R19       * * * * * * * * *
R19 AVG     1.1202    .2120   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R19 FIT     1.029     .140    VALUE FROM CONSTRAINED FIT

R20 *    ETA INTO 2GAMMA/(3PIO +2/3 PIO 2GAMMA)          (P11)/(P2+2/3P7)
R20         1.10      0.5          MULLER    63 DBC
R20       * * * * * * * * *
R20 FIT     1.200     .124    VALUE FROM CONSTRAINED FIT

R21 *    ETA INTO NEUTRALS/TOTAL                              (P1+P2+P7)/TOTAL
R21          .79       .08          BUNIATOV  67 SPRK                   11/67
R21       * * * * * * * * *
R21 FIT      .711      .013    VALUE FROM CONSTRAINED FIT

R22 *    ETA INTO PIZRC 2GAMMA/TOTAL                          (P7)/TOTAL
R22          .12  CR LESS          JACQUET   67 HLBC                   11/67
R22       * * * * * * * * *
R22 FIT      .101      .034    VALUE FROM CONSTRAINED FIT
```

14 ETA C-NONCONSERVING DECAY PARAMETER

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A   DECAY ASYMMETRY PARAMETER FOR PI+ PI- PIO   (UNITS 1C**-2)
A     1351     7.2       2.8          BALTAY    66 DBC
A      355     8.7       5.3          FOWLER    66 HBC
A      705    -6.1       4.0          LARRIBE   66 HBC                   8/67
A    10665     0.3       1.0          CNOPS     66 SPRK                  8/67
A     1300     5.8       3.4          OTHERS    66 HBC
A       *  * * * * * * * * *
A   AVG       1.2564    1.5470  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.8)
                    (SEE IDEOGRAM)

B   DECAY ASYMMETRY PARAMETER FOR PI+ PI- GAMMA
B       33    -0.02      C.17          CRAWFORD  66 HBC                  11/66
B     1620      .015      .025          BOWEN     67 SPRK                  8/67
B   N ABOVE EXPERIMENT IS SENSITIVE ONLY TO UPPER .4 OF GAMMA-RAY SPECTRUM
B               -.04      .08          LITCHFIEL 67 DBC                   8/67
B       * * * * * * * * *
B   AVG          .0095     .0236   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
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REFERENCES
14 ETA(549,JPG=C-+)I=0

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PEVSNER   61 PRL 7 421          PEVSNER,KRAEMER,NUSSBAUM,RICHARDSON +//JHU

ALFF      62 PRL 9 322          ALFF,BERLEY,COLLEY,BRUGGER +///CCL+RLTGERS
BASTIEN   62 PRL 8 114          BASTIEN,BERGE,DAHL,FERRO-LUZZI + ///// LRL
CHRETIEN  62 PRL 9 127          CHRETIEN+ //BRANC+BROWN+HARVARD+MIT+PACCVA
PICKUP    62 PRL 8 329          E PICKUP,ROBINSON,SALANT /////  NRC+CAN+BNL
SHAFER    62 CERN CONF 307      J SHAFER,FERRO-LUZZI,MURRAY + ///// LC+LRL

BACCI     63 PRL 11 37          BACCI,PENSO,SALVINI + //RCME U+CNEN FRASCA
BUSCHBEC  63 SIENA CONF 1 166   BUSCHBECK-CZAPP,COOPER + //VIENNA+CERN+AMS
CRAWFORD  63 PRL 10 546         F S CRAWFORD,LLOYD,FOWLER /////// LRL+DUKE
          AND PRL 16 907        F S CRAWFORD,L LLOYD,E FOWLER    //LRL+DUKE
DELCOURT  63 PL 7 215           DELCOURT,LEFRANCOIS,PEREZ Y JOREA// CRSAY
MULLER    63 SIENA CONF 99      MULLER,PAULI + //LPCFE+SACLAY IF+ROME+INFN

FOELSCHE  64 PR 134 B 1138      H W FOELSCHE,H L KRAYBILL ////////// YALE
KRAEMER   64 PR 136 B 496       KRAEMER,MADANSKY,FIELDS + // JHU+NW U+KCOC
PAULI     64 PL 13 351          E PAULI,A MULLER ////////// LPCHE+SACLAY

FOSTER1   65 PR 138 B 652       FOSTER,PETERS,MEER,LOEFFLER +//WISC+PURDUE
FOSTER2   65 ATHENS             FOSTER,GOOD,MEER              //WISCONSIN
FOSTER3   65 THESIS             M.C.FOSTER                    //WISCONSIN
PRICE     65 PRL  15  123       L.R.PRICE,F.S.CRAWFORD              //LRL
RITTENBE  65 PRL 15 556         RITTENBERG,KALBFLEISCH ////////// LRL+BNL

ALFF-STE  66 PR 145 1072        ALFF-STEINBERGER,BERLEY+//CCLLMBIA+RLTGERS
BALTAY    66 PRL 16 1224        +FRANZINI,KIM,KIRSCH+/COLLMBIA+STONY BROOK
CRAWFORD  66 PRL  16  333       F.S.CRAWFORD,L.R.PRICE              //LRL
DIGIUGNC  66 PRL 16 767         DIGIUGNO,GIORGI,SILVESTRI+//NAP+TRST+FRASC
GROSSMAN  66 PR 146  993        R GROSSMAN,L PRICE,F CRAWFORD ///////// LRL
GRUNHAUS  66 THESIS             J.GRUNHAUS                    //CCLLMBIA
JAMES     66 PR 142   896       F E JAMES,H L KRAYBILL ////////// YALE+BNL
JONES     66 PL 23   597        JONES,BINNIE,DUANE,HORSEY,MASON,+/ICL+RLTH
WAHLIG    66 PRL  17  221       WAHLIG,SHIBATA,PANNELLI          //MIT+PISA

BAGLIN1   67 PL 24B 637         BAGLIN,BEZAGUET,BEGRANGE,+      //E.POLY+UC
BAGLIN2   67 BAPS 12 567        BAGLIN,BEZAGUET,BEGRANGE,+      //E.POLY+UC
BALTAY1   67 PRL (TO BE PUB)    BALTAY,FRANZINI,KIM,NEWMAN,YEH,+     /COLUM
BALTAY2   67 PRL (TO BE PUB)    BALTAY,FRANZINI,KIM,NEWMAN+/COLUM+STONY BK
BAZIN     67 PRL 19 1157        BAZIN,GOSHAW,ZACHER,+      /PRINCETON,CLEENS
BEMPORAC  67 PL 25E 38C         BEMPORAC,BRACCINI,FOA,LUBELSMEY+/PISA,BCNN
    AND       PRIVATE COMMUNICATION
BILLING   67 PL 25B 435         BILLIG,BULLOCK,ESTEN,GOVAN,+      //UCL,OXF
BONAMY    67 HEIDELBERG CONF.   BONAMY,SONDEREGGER                //SACLAY
BUNIATOV  67 PL 25E 562         BUNIATOV,ZAVATTINI,DEINET,+     /CERN,KARLS
FELDMAN   67 PRL 18 866         FELDMAN,FRATI,GLEESON,HALPERN,+       /PENN
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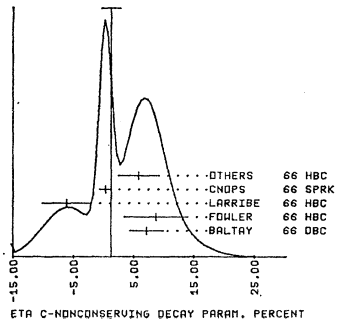


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FLATTE    67 PRL 18 976         S.M.FLATTE                          /LRL
JACQUET   67 PL 25B 574         JACQUET,NGUYEN-KHAC,BAGLIN+/EC.POLY,BERGEN
MICHAEL   67 THESIS             W.B.MICHAEL                         //UC
PRICE     67 PRL 18 1207        L.R.PRICE,F.S.CRAWFORD              /LRL
STRUGALS  67 JINR-E1-3100       STRUGALSKI,CHUVILG,IVANOVSKAJA,+   //DUBNA

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

BASTIEN   62 PRL 8 114          BASTIEN,BERGE,DAHL,FERRO-LUZZI,MILLER+/LRL
CARMONY   62 PRL 8 117          D CARMONY,A ROSENFELD,VAN DE WALLE /// LRL
ROSENFEL  62 PRL 8 293          A ROSENFELD,C CARMONY,VAN DE WALLE /// LRL

          REFERENCES ON ETA ASYMMETRY PARAMETERS

BALTAY    66 PRL  16  1224      BALTAY,FRANZINI,KIM,KIRSCH+/COLUM+STONY BK
CNOPS     66 PL 22 546          CNOPS,FINOCCHIARO,LASSALLE,+/CERN+ZUR+SACL
CRAWFORD  66 PRL  16  333       F.S.CRAWFORD,L.R.PRICE              //LRL
FOWLER    66 BAPS 11  38C       E.C.FOWLER                          //DUKE
LARRIBE   66 PL 23 60C          LARRIBE,LEVEQUE,MULLER,PALLI,+   /SACL+RLTH
OTHERS    66 PR 149  1044       COLUMBIA,LRL,PURDUE,WISCONSIN,YALE

BOWEN     67 PL 24B 2C6         BOWEN,CNOPS ,FINOCCHIARO,+ //CERN+ZUR+SACL
LITCHFIE  67 PL 24B 486         LITCHFIELD,RANGAN,SEGAR,SMITH+/RLTH+SACLAY
```

****** ********** ********** ********** ********** ********** ********** **********

p

16 PROTON (938,J=1/2) I=1/2

16 PROTON MASS (MEV)

```
M          938.256     0.005          COHEN     65 RVUE
```

16 PROTON LIFETIME (UNITS 10**26 YR)

```
T   *      CVER  10**20  YRS          GOLDHABER 54 TH 232 FISS.MODE INDEPEN
T   *      CVER  2.0 * 10**23 YRS     FLEROV    57 TH 232 FISS.MODE INDEPEN
T   *  CVER                 1.5       BACKENSTC 60 CNTR
T   *  CVER                60.0       KROPP     65 CNTR
T   *    KROPP AND BACKENSTOSS SENSITIVE TO PARTICULAR DECAY MODES OF PROT
```

16 PROTON MAGNET. MOMENT(E/2MP)

```
MM         2.792763 C.000030          COHEN     65 RVUE
```

****** ********** ********** ********** ********** ********** ********** **********

REFERENCES
16 PROTON (938,J=1/2) I=1/2

```
GOLDHABER 54 PR 96 1157 ERROR2 M GOLDHABER,F REINES+ ////LOS ALAMOS,BNL
FLEROV    57 SOV PHYS DOK 3 78  FLEROV,KLOCHKOV,SKOBKIN,TERENTEV //// USSR
BACKENST  60 NC   16  749       BACKENSTOSS,FRALENFELDER,+YAMS + //// CERN
COHEN     65 RMP 37 537         E R COHEN, J W M DUMOND //// NAASC+CALTECH
KROPP     65 PR 137 B 740       W R KROPP,F REINES ///CASE INST TECHNOLOGY
```

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n

17 NEUTRON (939,J=1/2) I=1/2

17 NEUTRON-PROTON MASS DIF.(MEV)

```
D          1.2939    C.0004          BONDELID  60 CNTR
D          1.2933    0.0001          SALGO     64 CNTR
D        * * * * * * * * *
D   AVG    1.2933     .0001   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)
```

17 NEUTRON LIFETIME (UNITS 10**3 SEC)

```
T          1.01      0.03     0.03  SOSNOVSKI 59 PILE
```

17 NEUTRON MAGNETIC MOMENT (MAGNETONS,938.2 MEV)

```
MM       -1.91314E C.000066          COHEN     56 RVUE

AV   *   GA/GV FOR NEUTRON BETA DECAY (SEE TEXT FOR SIGN CONVENTION)
AV          -1.18      C.02          BHALLA    66                     11/67
```

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REFERENCES
17 NEUTRON (939,J=1/2) I=1/2

```
COHEN     56 PR 104 283         V W COHEN, CORNELD, RAMSEY // BNL+HARVARD
SOSNOVSK  59 JETP  9  717       SOSNOVSKII,SPIVAK,PROKOFEV + // IAE MOSCOW
BONDELID  60 PR  120  887       BONDELID,BUTLER,KENNEDY +//LSNRL+CATH UNIV
SALGO     64 NP   53  457       R SALGO, STAUB, WINKLER, ZAMBONI // ZURICH
COHEN     65 RMP 37 537         E R COHEN,DUMOND ///// NAASC+CAL INST TECH
BHALLA    66 PL 19  651         C P BHALLA ////////////////////////// ALABAMA
```

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16 LAMBDA (1115,JP=1/2+) I=0

18 LAMBDA MASS (MEV)

```
    M   N SEE NOTE PRECEDING SIGMA- MASS LISTINGS
M          1115.44     C.12          BROWNIK   63 RVUE +  SEE NOTE L BELOW
M   L  ABOVE LAMBDA MASS HAS BEEN RAISED 35 KEV TO ACCOUNT FOR 46 KEV
M   L  INCREASE IN PROTON MASS AND 11 KEV DECREASE IN CHARGED PION MASS.
M   *  635 1115.86      C.09          BALTAY    65 HBC      ERROR IS STATIS.
M   N          1115.61     C.07          SCHMIDT   65 HBC
M   N SEE NOTE PRECEDING LAMBDA MASS LISTINGS
M   S 1147 1115.74       0.04          CHIEN     66 HBC      6.9 PBAR P       9/67
M   S  572 1115.69       0.05          CHIEN     66 HBC      6.9 PBAR PANTIL  9/67
M   S          ERROR PURELY STATISTICAL
M              1115.6      0.4          LONDON    66 HBC
M   *          1116.0      C.2          BADIER    67 HBC      2.4 PBAR P,LLBAR 8/67
M      195 1115.39       C.12          MAYEUR    67 EMUL                      11/67
M        * * * * * * * * *
M   AVG    1115.4230     .0030   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
```

16 LAMDA - ANTILAMBDA MASS DIFFERENCE (MEV)

```
DM             0.05      0.06          CHIEN     66 HBC      6.9 PBAR P       9/67
DM             0.25      0.15          BADIER    67 HBC      2.4 PBAR P       8/67
DM       * * * * * * * * *
DM  AVG        .0831     .0828   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)
```

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

STABLE PARTICLES

1B LAMBDA LIFETIME (UNITS 10**-10)

T	188	2.63	0.21	0.21	BOLDT	58	CC		
T	825	2.72	0.16	0.16	CRAWFORD	59	HBC		
T	140	2.72	0.29	0.27	BOWEN	60	CC		
T	186	2.60	0.28	0.20	C-C CHANG	62	HBC		
T	759	2.69	0.11	0.11	HUMPHREY	62	HBC		
T	2239	2.36	0.06	0.06	BLOCK	63	HEBC		
T	706	2.76	0.20		CHRETIEN	63	PBC		
T	754	2.59	0.09		HUBBARD	64	HBC		
T	2260	2.31	0.10		KREISLER	64	SPRK		
T	1378	2.59	0.07		SCHWARTZ	64	HBC		
T	635	2.51	0.16		BALTAY	65	HBC		
T	2534	2.6	0.1		HILL	65	SPRK		
T	U 6473	2.62	0.05		ARMENTEROS	66	HBC		8/67
T	516	2.35	0.09		BURAN	66	HLBC		
T	S 1147	2.50	0.14		CHIEN	66	HBC	6.9 PBAR P	9/67
T	S 972	2.70	0.20		CHIEN	66	HBC	6.9 PBAR P,ANTI	9/67
T	S	ERROR PURELY STATISTICAL							
T	2213	2.452	0.056	0.054	ENGELMANN	66	HBC		
T	585	2.66	0.13	0.11	AUERBACH	67	SPRK		8/67
T	*	2.44	0.15		BADIER	67	HBC	2.4 PBAR P	8/67
T	*	2.55	0.13		BADIER	67	HBC	2.4 PBAR P,ANTIL	8/67
T		* * * * * * * * *							
T	AVG	2.5191	.0351		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)				
		(SEE IDEOGRAM)							

T U UNPUBLISHED MEASUREMENTS (EXCEPT THESES) NOT INCLUDED IN AVERAGE

1E LIFETIME DIFFERENCE,(LAMBDA-ANTILAMDA)/AVERAGE

DT	0.044	0.085	BADIER	67	HBC	2.4 PBAR P	8/67

1G LAMBDA MAGNETIC MOMENT (MAGNETONS,938.26 MEV)

MM	-1.5	0.5		CCOL	62	SPRK	
MM	0.0	0.6		KERNAN	63	CC	
MM	8553	-1.39	0.72	ANDERSON	64	HBC	
MM	151	-0.5	0.28	CHARRIERE	65	EMUL	
MM		-0.75	0.19	HILL	66	SPRK	
MM		* * * * * * * * *					
MM	AVG	-.7289	.1654	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)			

1I LAMBDA PARTIAL DECAY MODES

P1	LAMBDA INTO PROTON PI-	S16S 8
P2	LAMBDA INTO NEUTRON PIO	S17S 9
P3	LAMBDA INTO PROTON MU- NEUTRINO	S16S 4S 2
P4	LAMBDA INTO PROTON E- NEUTRINO	S16S 3S 1

1B LAMBDA BRANCHING RATIOS

R1	* LAMBDA INTO (P PI-)/((P PI-)+(N PIO))					(P1)/(P1+P2)	
R1		0.627	0.031		CRAWFORD	59	HBC
R1		0.65	0.05		COLUMBIA	60	HBC
R1	U	0.685	0.017		ANDERSON	62	HBC
R1	903	0.643	0.016		HUMPHREY	62	HBC
R1		* * * * * * * * *					
R1	AVG	.6404	.0137	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			
R1	FIT	.653	.012	VALUE FROM CONSTRAINED FIT			
R2	* LAMBDA INTO (N PIO)/((P PI-)+(N PIO))					(P2)/(P1+P2)	
R2		0.23	0.09		EISLER	57	PBC
R2		0.43	0.14		CRAWFORD	59	HBC
R2		0.28	0.08		BAGLIN	60	PBC
R2		0.35	0.05		BROWN	63	XBC
R2	75	0.251	0.034		CHRETIEN	63	PBC
R2		* * * * * * * * *					
R2	AVG	.3044	.0250	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			
R2	FIT	.347	.012	VALUE FROM CONSTRAINED FIT			
R3	* LAMBDA INTO (P E- NEU)/TOTAL			(UNITS 1C**-3)		(P4)/(P1+P2)	
R3	15	2.0	0.5		HUMPHREY	61	RVUE
R3	8	2.9	1.5	1.2	AUBERT	62	FBC
R3	150	0.82	0.12	0.13	ELY	63	FBC
R3	20	1.55	0.34		LIND	64	HBC
R3	102	0.78	0.12		BAGLIN	64	FBC
R3		* * * * * * * * *					
R3	AVG	.8841	.1495	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.8)			
		(SEE IDEOGRAM)					
R4	* LAMBDA INTO (P MU- NEU)/TOTAL			(UNITS 1C**-4)		(P3)/(P1+P2)	
R4	* 1	0.2	CR GREATER		GOOD	62	HBC
R4	* 1	1.0	CR LESS		ALSTON	63	HBC
R4	* 2	1.0	CR LESS		KERNAN	64	FBC
R4	* BETWEEN 1.3 AND 6.0				LINC	64	HBC
R4	3	1.3	0.7		LIND	64	RVUE
R4	2	1.5	1.2		RONNE	64	FBC
R4		* * * * * * * * *					
R4	AVG	1.3508	.6046	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)			

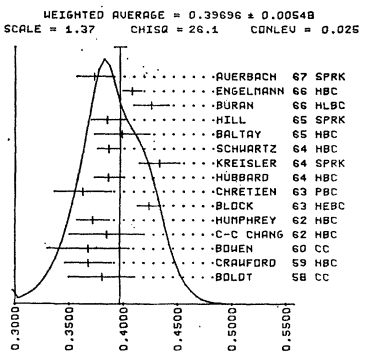
1B LAMBDA DECAY PARAMETERS

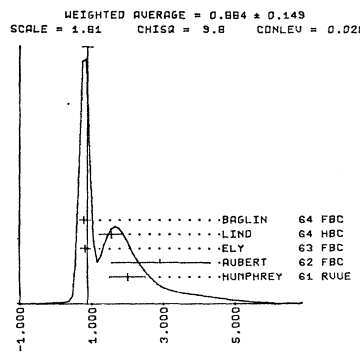
A-	* ALPHA LAMBDA- (LAMBDA INTO PI- PROTON)						
A-	1156	0.62	0.07	CRONIN	63	CNTR	LAMBDA FROM PI-P 8/67
A-	2529	0.747	0.086	MERRILL	66	HBC	FROM XI- DECAY 6/69
A-	*	0.663	0.022	BERGE	66	RVUE	INCLUDES ALL ABOVE
A-	10130	0.645	0.017	OVERSETH	67	SPRK	LAMBDA FROM PI-P 8/67
A-		* * * * * * * * *					
A-	AVG	.6473	.0162	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)			
AO	* ALPHAO /ALPHA- FOR LAMBDA (L INTO PIO N/L INTO PI- P)						
AO		1.10	0.27	CORK	60	CNTR	
AE	* ALPHA LAMBDA E- (LAMBDA INTO PROTON E- NEUTRINO)						
AE		0.06	0.19	BARLOW	65	SPRK	
F	* PHI ANGLE (TAN(PHI) = BETA/GAMMA) (DEGREE)						
F	1156	13.0	17.0	CRONIN	63	SPRK	LAMBDA FROM PI-P 11/67
F	10130	-8.0	6.0	OVERSETH	67	SPRK	LAMBDA FROM PI-P 11/67
F		* * * * * * * * *					
F	AVG	-5.6738	6.5908	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)			
AV	* GA/GV FOR LAMBDA BETA DECAY (SEE TEXT FOR SIGN CONVENTION)						
AV		-1.14	0.23	0.33 CONFORTO	65		11/67

REFERENCES
18 LAMBDA (1115,JP=1/2+) I=C

EISLER	57	NC	5	1700
BOLDT	58	PRL	1	148
CRAWFORD	59	PRL	2	266
BAGLIN	60	NC	18	1043
BOWEN	60	PR	119	2030
CORK	60	PR	120	1000
COLUMBIA	60	ROCH CONF		726
HUMPHREY	61	PRL	6	478
ANDERSON	62	CERN CONF		832
ARMENTER	62	CERN CONF		236
AUBERT	62	NC	25	479
BALTAY	62	CERN CONF		233
CHANG	62	THESIS		CUKE
COOL	62	PR	127	2223
GOOD	62	PRL	9	518
HUMPHREY	62	PR	127	1305
ALSTON	63	UCRL	10926	
BERGE	63	THESIS	(BERKELEY)	
BHOWMIK	63	NC	28	1494
BLOCK	63	PR	130	766
BROWN	63	PR	130	769
CHRETIEN	63	PR	131	2208
CRONIN	63	PR	129	1795
ELY	63	PR	131	868
KERNAN	63	PR	129	870
ANDERSON	64	PRL	13	167
BADIER	64	DUBNA CONF	1	593
BAGLIN	64	NC	35	977
HUBBARD	64	PR	135	B 183
KERNAN	64	PR	133	B 1271
KREISLER	64	PR	136	B 1074
LINC	64	PR	135	B 1483
RONNE	64	PL	11	357
SCHWARTZ	64	UCRL	11360	THESIS
BALTAY	65	PR	140	B 1027
BARLOW	65	PL	18	64
CHARRIER	65	PL	15	66
ALSO		NC	46A	205
CONFORTO	65	EC INT	HERZEGNOVI	
HILL	65	PRL	15	85
SCHMIDT	65	PR	140	B 1328
ARMENTER	66	PREPRINT		
BERGE	66	BERKELEY	CONF.	
BURAN	66	PL	20	318
CHIEN	66	PR	152	1171
ENGELMAN	66	NC	45A	1C38
HILL	66	BERKELEY	CONF	
LONCON	66	PR	143	1034
MERRILL	66	BERKELEY	CONF	
CF.	66	UCRL	16455	
AUERBACH	67	NC	47A	19
BADIER	67	PL	25B	152
MAYEUR	67	U.LIBR.	BRUX.	BUL32
OVERSETH	67	PRL	19	391

BERGE,CABIBBO // RVUE
BURAN,EIVINDSON,SKJEGGESTAD,TOFTE + //OSLO
+LACH,SANDWEISS,TAFT,YEH,CREN + ///YALE+BNL
ENGELMANN,FILTHUTH,ALEXANDER+/HEIDBG+KEIZM
HILL,LI,JENKINS,KYCIA,RUDERMAN // BNL
LONCON,RAU,GOLDBERG,LICHTMAN+//BNL+SYRACUS
MERRILL,SHAFER,BERGE // LRL
DEANE MERRILL (THESIS, BERKELEY) ///// LRL





ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

STABLE PARTICLES

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                19  SIGMA+   (1189,JP=1/2+)  I=1

                19  SIGMA+ MASS (MEV)

M   N SEE NOTE PRECEDING SIGMA- MASS LISTINGS

M       144 1189.38      0.15            BARKAS     63 EMUL +  SEE NOTE S BELOW
M        58 1189.46      0.22            BHOWMIK    64 EMUL +  SEE NOTE S BELOW
M   S  ABOVE SIGMA+ MASSES HAVE BEEN RAISED 30  KEV TO ACCOUNT FOR 46 KEV
M   S  INCREASE IN PROTON MASS AND 21 KEV DECREASE IN PION MASS
M         1189.59      0.11            SCHMIDT    65 HBC
M   H     1189.16      0.12            HYMAN      67 HEBC                      11/67
M   H  VALUE NOT INCLUDED IN AVERAGE BECAUSE OF POSSIBLE PROBLEMS WITH
M   H  RANGE MEASUREMENTS IN HELIUM BUBBLE CHAMBER,AS FOR H2 BUBBLE CHAM-
M   H  BER.  SEE NOTE PRECEDING LAMBDA MASS LISTING.
M                 * * * * * * * * *
M   AVG    1189.5114.    .0623    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

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                19  SIGMA+ LIFETIME (UNITS 10**-10)

T   *                                    GLASER     58 RVLE
T       127    0.98      0.16      0.12  PUSCHEL    60 EMUL
T        41    0.82      0.34      0.20  EVANS      60 EMUL
T       117    0.85      0.14      0.11  FRECEN     60 EMUL
T        54    0.80      0.10      0.067 KAPLON     60 EMUL
T        23    0.76      0.22      0.14  CHIESA     61 EMUL
T        49    0.75      0.13      0.09  BERTHELOT  61 HBC
T       140    0.82      0.10      0.08  BARKAS     61 EMUL
T       192    0.749     0.056     0.052 GRARD      62 HBC
T       456    0.765     0.04      0.04  HUMPHREY   62 HBC
T       203    0.84      0.12      0.08  BHOWMIK    64 EMUL
T       181    0.84      0.09            BALTAY     65 HBC
T       500    0.76      0.03            CARAYANNC  65 HBC
T              0.83      0.018           CHANG      65 HBC
T   S   125    0.86      0.15            CHIEN      66 HBC  +   6.9 PBAR P       9/67
T   S   117    1.10      0.24            CHIEN      66 HBC  -   6.9 PBAR P,ANTI  9/67
T   S      ERROR PURELY STATISTICAL
T       361    0.80      0.07            COOK       66 SPRK
T                 * * * * * * * * *
T   AVG            .8099     .0131    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

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                19  SIGMA+ MAGNETIC MOMENT (MAGNETONS/938.26 MEV)

MM  *    43    1.2       1.5             BRISTOL    66 EMUL     PRELIMINARY RES.  8/67
MM       381   1.5       1.1             COOK       66 SPRK
MM       52    3.5       1.5             KOTELCHUC  67 EMUL     K-P AT 1.15BEV/C  8/67
MM       51    3.0       1.2             SULLIVAN   67 EMUL     PHOTOPRODUCTION   8/67
MM                * * * * * * * * *
MM  AVG          2.4823    .7133    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

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                19  SIGMA+ PARTIAL DECAY MODES

P1      SIGMA + INTO PROTON PIO                                  S16S 9
P2      SIGMA + INTO NEUTRON PI+                                 S17S 8
P3      SIGMA + INTO NEUTRON PI+ GAMMA                           S17S 8S 0
P4      SIGMA + INTO LAMBDA E+ NEU                               S18S 3S 0
P5      SIGMA + INTO PROTON GAMMA                                S16S 0
P6      SIGMA + INTO NEUTRON MU+ NEUTRINO                        S17S 4S 2
P7      SIGMA + INTO NEUTRON E+ NEUTRINO                         S17S 3S 1

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                19  SIGMA+  BRANCHING RATIOS

R1  *  SIGMA+  INTO (NEUTRON PI+)/(NUCLEON PI)          (P2)/(P1+P2)
R1        306    0.450     0.024           HUMPHREY   62 HBC
R1        534    0.46      0.02            CHANG      65 HBC
R1                * * * * * * * * *
R1  AVG            .4723     .0154    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

R2  *  SIGMA+ INTO (NEUT PI+ GAM)/(PI+N)  (UNITS 10**-3) (P3)/(P2)
R2  *  ABOUT  1.8                 BAZIN2     65 HBC                           8/67
R2  *  FOR PI+ MOM LESS THAN 166 MEV/C

R3  *    SIGMA+ INTO (LAMBDA E+ NEU)/TOTAL (UNIT 10**-5) (P4)/TOTAL
R3        4     3.3       1.7             WILLIS     64 HBC      STOP. K-
R3        6     2.0       0.8             BARASH     67 HBC      STOP K-          8/67
R3                * * * * * * * * *
R3  AVG            2.2357    .7239    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

R4  *  SIGMA+  INTO (N MU+ NEU)/(PI+N)   (UNITS 10**-4)  (P6)/(P2)
R4  *     1      120 ANALYSED EVENTS     GALTIERI   62 EMUL     NO RATIO QUOTED  11/67
R4        0     1710 EFFECTIVE DENOM.    NAUENBERG  64 HBC      SEE NOTE E       11/67
R4        0    10150 EFFECTIVE DENOM.    COURANT    64 HBC      SEE NOTE E       11/67
R4        1    18750 EFFECTIVE DENOM.    EISELE     67 HBC                       11/67
R4  E                EFFECTIVE DENOM.  TAKEN FROM EISELE 67                      11/67

R5  *  SIGMA+  INTO (N E+ NEU)/(N PI+)  (UNITS 10**-4)  (P7)/(P2)
R5        0    16220 EFFECTIVE DENOM.    COURANT    64 HBC      SEE NOTE E       11/67
R5        1    11400 EFFECTIVE DENOM.    NAUENBERG  64 HBC      SEE NOTE E       11/67
R5        0     2720 EFFECTIVE DENOM.    MURPHY     64 HBC      SEE NOTE E       11/67
R5  E                EFFECTIVE DENOM.  TAKEN FROM EISELE 67                      11/67

R6  *  SIGMA+  INTO (P GAMMA)/(P PI0)  (UNITS 10**-2)   (P5)/(P1)
R6  *     1     0.68  OR LESS          CARRARA    64 HBC
R6       24     0.37      0.08        BAZIN      65 HBC
R6        4     0.17                  CLARENI    65 EMUL

R7  *  SIGMA+ INTO LEPTONS / SIGMA- INTO LEPTONS
R7  N     3      .023      .017        EISELE     67          SEE NOTE N       11/67
R7  N        AVERAGE OF ALL DATA IN R4 AND R5 UP TO EISELE 67                    11/67

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                19 SIGMA+ DECAY PARAMETERS

A+  *   ALPHA+/ALPHAO FOR SIGMA+ (SIG+ TO PI+ N)/(SIG+ TO PI0 P)
A+           +0.04     0.11            CORK       60 CNTR     SIG+ FROM PI+P
A+  *        +0.20     0.24            TRIPP      62 HBC   +  REPLAC.BY BANGER
A+     3500   -.014     .052           BANGERTER  66 HBC   +  SIG+ FROM K-P
A+     2600   -.047     .07            BERLEY     66 HBC   +  SIG+ FROM K-P
A+                * * * * * * * * *
A+  AVG           -.0175    .0390    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

A0  *  ALPHA SIGMA0 (SIG+ INTO PI0 PROTON)
A0           -0.80     0.16            BEALL      62 CNTR
A0  *        -0.90     0.25            TRIPP      62 HBC      REPLAC. BY BANGER
A0     5200  -0.986    0.072           BANGERTER  66 HBC      K-P TO SIG+ PI-
A0                * * * * * * * * *
A0  AVG           -.9547    .0696    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

F   *      PHI ANGLE (TAN(PHI)=BETA/GAMMA)  (DEGREE)
F       370  180.      30.             BERLEY     66 HBC  +  NEUTRON RESCATT.

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REFERENCES

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                19  SIGMA + (1189,JP=1/2+)  I=1

GLASER    58 CERN CONF 270      GLASER,GOOD,MORRISON ////////////// MICH+LRL
EVANS     60 NC 15 873          BRIST+BRUSS+IAS-L.COL-DUBLIN+LON+MILAN+PAD
FRECEN    60 NC 16 611          S FRECEN,P KORNELUK,R WHITE ////////// LRL
KAPLON    60 ANP 9 139          R KAPLON,A MELISSINOS,YAMANOUCHI // ROCHES
CORK      60 PR 120 1000        CORK,KERTH,WENZEL,CRONIN,CCCL /LRL+PRI+BNL
PUSCHELL  60 NP 20 254          W PUSCHEL ////////////////// MAX PLANCK INST

BARKAS    61 PR 124 1209        BARKAS,CYER,MASCN,NICHOLS,SMITH ////// LRL
BERTHELO  61 NC 21 693          BERTHELOT,DAUDIN,GOUSSU + /// SACLAY+CRSAY
CHIESA    61 NC 19 1171         CHIESA,GUASSIATI,RINALDO ////// INFN-TURIN

BEALL     62 PRL 8 75           BEALL,CORK,KEEFE,MURPHY,WENZEL /////// LRL
GRARD     62 PR 127 1067        R GRARD,G A SMITH ////////////////////// LRL
GALTIERI  62 PRL 9 26           GALTIERI,BARKAS,HECKMAN,PATRICK,SMITH//LRL
HUMPHREY  62 PR 127 1305        W E HUMPHREY,R R ROSS ////////////////// LRL
TRIPP     62 PRL 9 66           R D TRIPP,M B WATSON,M FERRO-LUZZI /// LRL

BARKAS    63 PRL 11 26          W H BARKAS,J N CYER,P H HECKMANN ///// LRL
    ALSO  61 UCRL 9450          JOHN CYER (THESIS, BERKELEY)  /////// LRL

BHOWMIK   64 NP 53 22           B BHOWMIK,P JAIN,P MATHUR,LAKSHMI // CELHI
CARRARA   64 PL 12 72           CARRARA,CRESTI,GRIGGLETTO,PERUZZO+//PADOVA
COURANT   64 PR 136 B 1791      COURANT,FELTHUTH+//CERN+HEIDLE+MD+NRL +BNL
MURPHY    64 PR 134 B 188       G THORNTON MURPHY ////////////// WISCONSIN
NAUENBER  64 PRL 12 679         NAUENBERG,MARATECK,BLUMENFELD+ /COL+RLT+PR
WILLIS    64 PRL 13 291         WILLIS,COURANT,ENGELMAN+//BNL+CERN+HEIDMD

BALTAY    65 PR 140 B 1027      BALTAY,SANDWEISS,COLWICK,KCPP + //YALE+BNL
BAZIN     65 PRL 14 154         BAZIN,BLUMENFELD,NAUENBERG +//PRINCE+COLUM
BAZIN2    65 PR 140  B1358        BAZIN,PLANG,SCHMIDT+//PRINCE,RUTG,COLUM
CARAYAN   65 PR 138 B 433       CARAYANNOPOULOS,TAUTFEST,WILLMANN// PURDUE
CHANG     65 NEVIS 145  THESIS  CHUNG YUN CHANG /////////////////// COLUMBIA
   ALSO   66 PR  151  1081      CHUNG YUN CHANG /////////////////// COLUMBIA
QUARENI   65 NC 40 A 926        CLARENI,CARTACCI + //////ECL+FIR+GEN+FARMA
SCHMIDT   65 PR 140 B 1328    . P SCHMIDT ////////////////////////// COLUMBIA

BANGERTER 66 PRL  17  495       BANGERTER,GALTIERI,BERGE,MURRAY+   // LRL
BERLEY    66 PRL 17 1071        +PERZBACH,KOFLER,YAMAMOTO +//BNL+MASS+YALE
BRISTOL   66  BERKELEY CONF     BRISTOL-CERN-LALSANNE-MUNICH-ROME COLLABOR
CHIEN     66 PR  152  1171      +LACH,SANDWEISS,TAFT,YEH,CREN + //YALE+BNL
COOK      66 PRL  17  223       V COOK,EWART,MASEK,ORR,PLATNER//WASHINGTON

BARASH    67 PRL 19  181        BARASH,CAY,GLASSER,KEHOE,KNOP +///MARYLAND
EISELE    67 ZEIT.PHYS.205,409  +ENGELMANN,FILTHTH,POLISH,+EPP+//HEIDELB.
HYMAN     67 PL 25 B 376        +LOKEN,PEWITT,MCKENZIE,KEYES+/ARG+CARN+NNU
KOTELCHU  67 PRL 18 1166        KOTELCHUCK,GOZA,SULLIVAN,ROSS//VANDERBILT
SULLIVAN  67 PRL 18 1163        SULLIVAN,MCINTURFF,KOTELCHUC//VANDERBILT
    ALSO  64 PRL 13 246         A D MCINTURFF,C E ROOS       // VANDERBILT

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

TRIPP     62 PRL 8 175          R TRIPP,M WATSON,M FERRO-LUZZI /////// LRL
ALFF      63 SIENA CONF 1 205   ALFF,NAUENBERG,KIRSCH,BERLEY+/CCLU+RUT+BNL
    ALSO  65 PR 137 B 1105      ALFF,GELFAND,BRUGGER,BERLEY+/COLUM+RLT+BNL
COURANT   63 SIENA CONF 1 73    COURANT,FELTHUTH,BURNSTEIN,CAY+//CERN+MARY

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Σ^-

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                20  SIGMA-   (1158,JP=1/2+)  I=1

                20 SIGMA- MASS (MEV)

M           1197.47     0.11            SCHMIDT    65 HBC

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                20 SIGMA- MASS DIFFER.(-)-(+)(MEV)

D       87    8.25      0.40            BARKAS     63 EMUL
D     2500    8.25      0.25            DOSCH      65 HBC
D                 * * * * * * * * *
D   AVG            8.2500    .2120    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)

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                20  (SIGMA-) - (LAMBDA) MASS DIFFERENCE (MEV)

M   N SEE NOTE PRECEDING SIGMA- MASS LISTINGS

DL             81.70     0.19            BURNSTEIN 64 HBC

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                20  SIGMA- LIFETIME (UNITS 10**-10)

T               1.67      0.40      0.28  BROWN      58 PBC
T               1.89      0.33      0.25  EISLER     58 PBC
T        45     1.35      0.32      0.17  CHIESA     61 EMUL
T        41     1.75      0.39      0.30  BARKAS     61 EMUL
T      1208     1.58      0.06      0.06  HUMPHREY   62 HBC
T               1.666     0.026           CHANG      65 HBC
T   S   61     2.08      0.22            CHIEN      66 HBC  -   6.9 PBAR P       9/67
T   S   64     1.46      0.31            CHIEN      66 HBC  +   6.9 PBAR P,ANTI  9/67
T   S      ERROR PURELY STATISTICAL
T                 * * * * * * * * *
T   AVG            1.6554    .0303    AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                          (SEE IDEOGRAM)

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Hyperon Masses

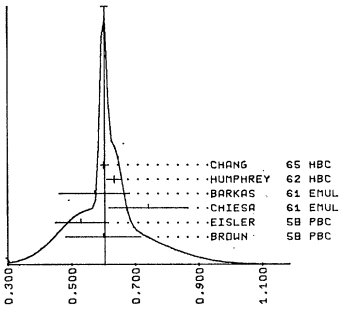
For the Λ mass, there is a large discrepancy between the measurement of SCHMIDT 65 and the emulsion measurements reviewed by BHOWMIK 63. The former determination used range measurements in a hydrogen bubble chamber.

The Σ^- mass of SCHMIDT 65 (1196.53 ± 0.24 MeV) also obtained using HBC range measurements, is also in disagreement with previous emulsion determinations and with the one, by the same author, which does not use range measurements. Therefore, as a temporary procedure, we do not include any determinations of absolute masses which use range measurements in HBC. BURNSTEIN 64 has two sorts of measurements: absolute masses which again depend on HBC ranges, and mass differences; we have used only the latter. Both authors, P. Schmidt and G. Snow (representing Burnstein et al.) agree with this procedure.

STABLE PARTICLES

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

WEIGHTED AVERAGE = 0.6041 ± 0.0109
SCALE = 1.27 CHISQ = 1.6 CONLEV = 0.206



SIGMA - DECAY RATE (UNITS 10**10 SEC -1)

Σ^0

21 SIGMA 0 (1193,JP=1/2+) I=1

21 (SIGMA-) - (SIGMA0) MASS DIFFERENCE (MEV)

D1 * SEE NOTE PRECEDING SIGMA- MASS LISTINGS

D1		18	4.75	0.1	BURNSTEIN	64 HBC
D1		37	4.87	0.12	DOSCH	65 HBC
D1		12	4.95	0.12	SCHMIDT	65 HBC
D1			* * * * * * * * *			
D1	AVG		4.8547	.0706	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)	

21 (SIGMA C) - (LAMBDA) MASS DIFFERENCE (MEV)

M N SEE NOTE PRECEDING SIGMA- MASS LISTINGS

DL	76.61	0.28	SCHMIDT	65	

21 SIGMA0 LIFETIME (UNITS 10**-14)

T	*	1.0 OR LESS	DAVIS	62 EMUL	

21 SIGMA C PARTIAL DECAY MODES

P1	SIGMA 0 INTO LAMBDA GAMMA	S18S 0
P2	SIGMA 0 INTO LAMBDA E+ E-	S18S 3S 3

R1 * SIGMA 0 INTO(LAMBDA E+ E-)/TOTAL (P2)/(P1+P2)

R1	*	0.00545	THEORET. CAL. FEINBERG	58	QUANTUM ELECT.

2C SIGMA- PARTIAL DECAY MODES

P1	SIGMA - INTO NEUTRON PI-	S17S 8
P2	SIGMA - INTO NEUTRON PI- GAMMA	S17S 8S 0
P3	SIGMA - INTO NEUTRON MU- NEUTRINO	S17S 4S 2
P4	SIGMA - INTO NEUTRON E- NEUTRINO	S17S 3S 1
P5	SIGMA - INTO LAMBDA E- NEUTRINO	S18S 3S 1

2C SIGMA- BRANCHING RATICS

R1	*	SIGMA - INTO (N MU- NEU)/(N PI-) (UNITS 10**-3) (P3)/(P1)					
R1		22	0.66	0.15	COURANT	64 HBC	
R1		11	0.56	0.20	BAZIN	65 HBC	FROM STOP. K-
R1			* * * * * * * * *				
R1	AVG		.6240	.1200	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R2	*	SIGMA - INTO (N E- NEU)/(N PI-) (UNITS 10**-3) (P4)/(P1)					
R2		9	1.0	0.4	0.3 MURPHY	64 PBC	
R2		16	1.37	0.34	NAUENBERG	64 HBC	
R2		16	1.15	0.4	MILLER	64 FBC	
R2		31	1.4	0.3	CCURANT	64 HBC	
R2			* * * * * * * * *				
R2	AVG		1.2511	.1711	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R3	*	SIGMA - INTO (LAMBDA E- NEU)/(N PI-) (UNITS 10**-4)(P5)/(P1)					
R3		11	0.75	0.28	CCURANT	64 HBC	STOP. K-
R3		35	0.64	0.12	BARASH	67 HBC	STOP K- 8/67
R3			* * * * * * * * *				
R3	AVG		.6571	.1103	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		
R4	*	SIGMA - INTO (N PI- GAMMA)/(NPI-) (UNITS 10**-3)(P2)/(P1)					
R4	*	ABOUT 1.1			BAZIN	65 HBC	8/67
R4	*	FOR PI- MOM LESS THAN 166 MEV/C					

2C SIGMA- DECAY PARAMETERS

A-	*	ALPHA SIGMA-					
A-	*		-0.16	0.21	TRIPP	62 HBC	REPL.BY BANGERTER
A-		6500	-0.010	0.043	BANGERTER	66 HBC	K-P TO SIG- PI+
A-		6068	-0.104	0.04	BERLEY	67 HBC	K-P TO SIG- PI+ 11/67
A-			* * * * * * * * *				
A-	AVG		-.0604	.0469	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)		
F	*	PHI ANGLE (TAN(PHI)=BETA/GAMMA) (DEGREES)					
F		1006	-22.	30.	BERLEY	67 HBC	K-P TO SIG- PI+ 11/67
AV	*	GA/GV FOR SIGMA TO LAMBDA BETA DECAY (SEE TEXT FOR SIGN CONVENTION)					
AV	*	PREDICTED TO ZERO BY CONSERVED VECTOR CURRENT THEORY					
AV		45	0.31	0.30	BARASH	67 HBC	11/67
		44	0.3	0.4	EISELE	67 HBC	11/67

REFERENCES

2C SIGMA-(1198,JP=1/2+)I=1

BROWN 58 CERN CONF 270	BROWN,GLASER,GRAVES,PERL,CRONIN + /// MICH	
EISLER 58 NC SERIC 10 150	EISLER,GASSI,CONVERSI + / CCL+BNL+BOL+PISA	
BROWN 57 PR 108 1036	J BROWN, D GLASER, M PERL / MICHIGAN + BNL	
BARKAS 61 PR 124 1209	BARKAS,DYER,MASON,NICKOLS,SMITH ////// LRL	
CHIESA 61 NC 19 1171	A M CHIESA,B QUASSIATI,G RINAUDO /// TURIN	
HUMPHREY 62 PR 127 1305	W E HUMPHREY,R R ROSS /////////////// LRL	
TRIPP 62 PRL 9 66	R D TRIPP,M WATSON,M FERRO-LUZZI ///// LRL	
BARKAS 63 PRL 11 26	W H BARKAS,J N DYER,H H HECKMAN ////// LRL	
BURNSTEI 64 PRL 13 66	BURNSTEIN,DAY,KEHOE,SECHI ZORN,SNOW// MARY	
COURANT 64 PR 136 B 1791	CCURANT,FILTHUTH+///CERN+EIDLB+MD+NRL+BNL	
MILLER 64 PL 11 262	MILLER,STANNARD,BEZAGUET+ /LCND+PARIS+BERG	
MURPHY 64 PR 134 B 188	C THORNTON MURPHY /////////////// WISCONSIN	
NAUENBER 64 PRL 12 679	NAUENBERG,SCHMIDT,MARATECK+ /CCL+RUT+PRINC	
BAZIN 65 PR 140 B 1358	BAZIN,PLANO,SCHMIDT + //PRINC+RUTG+CCLUM	
CHANG 65 NEVIS 145 THESIS	CHUNG YUN CHANG ////////////// COLUMBIA	
ALSO 66 PR 151 1081	CHUNG YUN CHANG ////////////// CCLUMBIA	
DOSCH 65 PL 14 239	DOSCH,ENGELMANN,FILTHUTH,FEPP,KLUGE+ /HEID	
SCHMIDT 65 PR 140 B 1328	P SCHMIDT ////////////////////// COLUMBIA	
BANGERTE 66 PRL 17 495	BANGERTER,GALTIERI,BERGE,MURRAY+ // LRL	
CHIEN 66 PR 152 1171	+LACH,SANDWEISS,TAFT,YEH,CREN + //YALE+BNL	
BARASH 67 PRL 19 181	BARASH,DAY,GLASSER,KEHOE,KNOP +///KARYLAND	
BERLEY 67 PRL 19 979	BERLEY,FERTZBACH,KOFLER +///BNL,MASS,YALE	
EISELE 67 HEIDELBERG CONF	EISELE,ENGELMANN,FILTHUTH+///// HEICELBERG	

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22 XI- (1321,JP=1/2) I=1/2

22 XI- MASS (MEV)

M	H	11	1317.0	2.2	WANG	61 PBC	
M	H	18	1317.9	1.9	FOWLER	61 PBC	
M	H (OLD DATA AND LOW STATISTICS DROPPED ON SUGGESTION OF J R HUBBARD)						
M	*	1	1322.0	1.3	BROWN	62 HBC	ANTI-XI-
M		517	1321.4	0.4	JAUNEAU	63 FBC	
M		62	1321.1	0.65	SCHNEIDER	63 HBC	
M		241	1321.1	0.3	BADIER	64 HBC	
M	*	ALL MASSES ABOVE WERE RAISED 0.09 MEV BECAUSE LAMBDA MASS RAISED					
M		149	1321.3	0.4	PJERROU	65 HBC	11/67
M		5	1320.69	0.93	CHIEN	66 HBC + 6.9 PBAR P,ANTI	9/67
M		6	1321.67	0.52	CHIEN	66 HBC - 6.9 PBAR P	9/67
M		299	1321.4	1.1	LONDON	66 HBC	
M	S	12	1321.7	0.6	SHEN	67 HBC	ANTI-XI- 10/67
M	S	THE ERROR IS STATISTICAL ONLY					
M			* * * * * * * * *				
M	AVG		1321.2582	.1777	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		

22 MASS DIFFERENCE,(XI-)-(ANTI-XI-) IN MEV

DM	1.0	1.1	CHIEN	66 HBC	6.9 PBAR P	9/67

22 XI- LIFETIME (UNITS 10**-10)

T	H	11	3.5	3.4 1.23	WANG	61 PBC	
T	H	18	1.28	0.41 0.25	FOWLER	61 PBC	
T	H (OLD DATA AND LOW STATISTICS DROPPED ON SUGGESTION OF J R HUBBARD)						
T		517	1.86	0.15 0.14	JAUNEAU	63 FBC	
T		62	1.55	0.31 0.31	SCHNEIDER	63 HBC	
T	*	356	1.77	0.12	CARMONY	64 HBC	REP BY PJERROU 65
T		754	1.65	0.07	HUBBARD	64 HBC	
T		246	1.70	0.12	PJERROU	65 HBC	11/67
T	S	6	1.37	0.51	CHIEN	66 HBC - 6.9 PBAR P	9/67
T	S	5	1.51	0.55	CHIEN	66 HBC + 6.9 PBAR P,ANTI	9/67
T		299	1.80	0.16	LONDON	66 HBC	
T	S	12	1.9	0.7 0.5	SHEN	67 HBC	ANTI-XI- 10/67
T	S	THE ERROR IS STATISTICAL ONLY					
T			* * * * * * * * *				
T	AVG		1.7298	.0540	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)		

22 XI- PARTIAL DECAY MODES

P1	XI- INTO LAMBDA PI-	S18S 8
P2	XI- INTO LAMBDA E- NEUTRINO	S18S 3S 1
P3	XI- INTO NEUTRON PI-	S17S 8
P4	XI- INTO LAMBDA MU- NEUTRINO	S18S 4S 2
P5	XI- INTO SIGMA0 E- NEUTRINO	S21S 3S 1
P6	XI- INTO SIGMA0 MU- NEUTRINO	S21S 4S 2
P7	XI- INTO NEUTRON E- NEUTRINO	S17S 3S 1

22 XI- BRANCHING RATICS

R1	*	XI- INTO (LAMBDA E- NEU)/(LAMBDA PI-) (UNITS 10**-3) (P2)/(P1)					
R1		1	155	EFFECTIVE CONDM.	CARMONY	63 HBC	11/67
R1		0	260	EFFECTIVE CONDM.	JAUNEAU	63 HBC	11/67
R1		0	220	EFFECTIVE CONDM.	BERGE	66 HBC	11/67
R1		1	155	EFFECTIVE CONDM.	LONDON	66 HBC	11/67
R1		2	1976	EFFECTIVE CONDM.	BERGE	67 HBC	11/67
R1		0	717	EFFECTIVE CONDM.	TRIPPE	67 HBC	11/67
R1		4	0.90 0.71	C.43	BERGE	67 RVUE	11/67
R1	*	BERGE 67 (RVUE) INCLUDES ALL ABOVE EVENTS.					

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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R2  *  XI- INTO (NEUTRON PI-)/(LAMBDA PI-)                    (P3)/(P1)
R2  *        0.005   OR LESS          FERRO-LLZ 63 HBC

R3  *     XI- INTO (LAMBDA MU- NEUTRINO)/TOTAL                 (P4)/TOTAL
R3  *        0.012   OR LESS          BERGE     66 HBC

R4  *     XI- INTO (SIGMA0 E- NEUTRINO)/TOTAL                  (P5)/TOTAL
R4  *        0.003   OR LESS          BERGE     66 HBC

R5  *     XI- INTO (SIGMA0 MU- NEUTRINO)/TOTAL                 (P6)/TOTAL
R5  *        0.005   OR LESS          BERGE     66 HBC

R6  *     XI- INTO (N E- NEUTRINO) / (LAMBDA PI-)              (P7)/(P1)
R6  *        0.01  CR LESS            BINGHAM   65 RVUE   CONF.LIMIT 0.9

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                        22  XI- DECAY PARAMETERS

A   *  ALPHA XI-
A            -0.44      0.11          JAUNEAU   63 FBC
A      62    -0.73      0.21          SCHNEIDER 63 HBC
A      240   -0.5       0.35          BADIER    64 HBC
A      356   -0.62      0.12          CARMONY   64 HBC
A   * 1004   -0.366     0.057         BERGE     66 HBC   - REPL. BY MERRILL
A     2529   -0.342     0.044         MERRILL   66 HBC     USED ALPHA=-.747
A      364   -0.47      0.12          LONDON    66 HBC   USING A-LAMB =0.62
A   *         -0.391     0.032         BERGE 2   66 RVUE  INCLUDES ALL ABOVE
A                 . . . . . . . . .
A   AVG       -.4023     .0511   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)

F   *  PHI ANGLE (TAN(PHI)=BETA/GAMMA)  (DEGREES)
F          -16.       37.           JAUNEAU   63 FBC
F      62   45.0       30.0          SCHNEIDER 63 HBC
F     356   54.0       25.0          CARMONY   64 HBC
F   * 1004   0.45       10.7          BERGE     66 HBC   - REPL. BY MERRILL
F     364    0.0        17.0          LONDON    66 HBC     USED ALPHA=.62
F    2529    1.2        7.5           MERRILL   66 HBC     USED ALPHA=.747
F                 . . . . . . . . .
F   AVG       5.9177    7.9657   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)

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REFERENCES

22 XI - (1321,JP=1/2) I=1/2

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FOWLER    61 PRL 6 134          FOWLER,BERGE,EBERHARD,ELY,GOOD,POWELL+/LRL
WANG      61 JETP 13 512        K WANG,T WANG,VIRYASOV,TING,SOLOVEV+//JINR
BERTANZA  62 PRL 9 229          BERTANZA,BRISSON,GOLDBERG,GRAY+/BNL+SYRACU
BROWN     62 PRL 8 255          BROWN,GLLWICK,FOWLER,GAILLLLD +///BNL+YALE

CARMONY   63 PRL  10  361       CARMONY,PJERROU                    // UCLA
FERROLLZ  63 PR 130 1566        FERRO-LLZZI,ALSTON,ROSENFELD,WOJCICKI//LRL
JAUNEAL   63 SIENA CONF 4       JAUNEAU+ ///// PARIS+CERN+LCND+RUTH+BERGEN
JAUNEAL1  63 PL  5  261         JAUNEAU,MORELLET+//EP,CERN,LCN,RUTH,BERGEN
SCHNEIDE  63 PL 4 360           H SCHNEIDER ////////////////////////// CERN

CARMONY   64 PRL 12 482         CARMONY,PJERROU,SCHLEIN,SLATER,STORK+/UCLA
BADIER    64 DUBNA CONF         BADIER,DEMOULIN,BARLOUTAUD+ /PARIS+SAC+ZEE
HUBBARD   64 PR 135 B 183       HUBBARD,BERGE,KALBFLEISCH,SHAFER +/////LRL
BINGHAM   65 PRSL  285  202     H H BINGHAM                        // CERN
PJERROU   65 PRL 14 275         + SCHLEIN,SLATER,SMITH,STORK,TICHO // UCLA
PJERROU   65 THESIS             G M PJERROU ////////////////////////// UCLA

BERGE     66 PR  147  945       BERGE,EBERHARD,HUBBARD,MERRILL + ///// LRL
BERGE 2   66    BERKELEY CONF.  BERGE,CABIBBO                      // RVUE
CHIEN     66 PR  152  1171      +LACH,SANDWEISS,TAFT,YEH,CREN + //YALE+BNL
LONDON    66 PR 143 1034        LONDON,RAU,GOLDBERG,LICHTMAN//BNL+SYRACUS
MERRILL   66  BERKELEY CONF     MERRILL,SHAFER,BERGE               // LRL
     CF. 66 UCRL 16455          DEANE MERRILL (THESIS, BERKELEY) ///// LRL
BERGE     67 PREPRINT           BERGE,DAUBER,HUBBARD ////////////////// LRL
SHEN      67 PL 25 B 443        B.C.SHEN,A.FIRESTONE,G.GOLDHABER// UCB+LRL
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QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

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CARMONY   64 PRL 12 482         CARMONY,PJERROU,SCHLEIN,SLATER,STORK+/UCLA  J
SHAFER    65 UCRL 11884         J BUTTON SHAFER, DEANE MERRILL  ////  LRL  J
MERRILL   66 UCRL 16455         DEANE MERRILL (THESIS, BERKELEY)  ///  LRL  J
BERGE     67 PRIV COMM          BERGE,DAUBER,HUBBARD ////////////////// LRL

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Ξ^0

23 XI 0 (1314,JP=1/2) I=1/2

23 XI MASS DIFFERENCE (-)-(0)(MEV)

```
D      23    6.6       1.6           JAUNEAU   63 FBC
D   *  45    6.1       1.6           CARMONY   64 HBC    REP BY PJERROU 65
D      88    6.1       0.9           PJERROU   65 HBC                      11/67
D      29    6.9       2.2           LONDON    66 HBC
D                . . . . . . . . .
D   AVG       6.3395    .7389   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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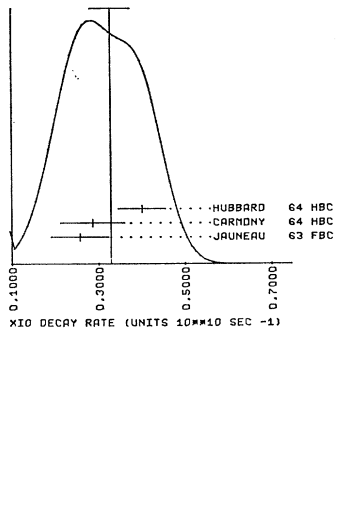
WEIGHTED AVERAGE = 0.3283 ± 0.0465
SCALE = 1.26 CHISQ = 3.2 CONLEV = 0.203



23 XI 0 LIFETIME (UNITS 10**-10)

```
T      24    3.9       1.4       0.8C  JAUNEAU   63 FBC
T   *  45    3.5       1.0       0.8   CARMONY   64 HBC    REP BY PJERROU 65
T     101    2.5       0.4       0.3   HUBBARD   64 HBC
T      80    3.0       0.5             PJERROU   65 HBC                      11/67
T                . . . . . . . . .
T   AVG       2.9468    .3874   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
                        (SEE IDEOGRAM)

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23 XI 0 PARTIAL DECAY MODES

```
P1      XI 0 INTO LAMBDA PIO                                    S10S 9
P2      XI 0 INTO PROTON PI-                                    S16S 8
P3      XI 0 INTO PROTON E- NEU                                 S16S 3S 1
P4      XI 0 INTO SIGMA+ E- NEU                                 S19S 3S 1
P5      XI 0 INTO SIGMA- E+ NEU                                 S20S 3S 1
P6      XI 0 INTO SIGMA+ MU- NEUTRINO                           S19S 4S 2
P7      XI 0 INTO SIGMA- MU+ NEUTRINO                           S20S 4S 2
P8      XI 0 INTO PROTON MU- NEUTRINO                           S16S 4S 2

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23 XI 0 BRANCHING RATIOS

```
R1  *  XI 0 INTO(PROTON PI-)/(LAMBDA PIO)                      (P2)/(P1)
R1  *     0     0.027  CR LESS            TICHO     63 HBC
R1  *     0     0.005  CR LESS            HUBBARD   66 HBC

R2  *  XI 0 INTO(PROTON E- NEU)/(LAMBDA PIO)                   (P3)/(P1)
R2  *     0     0.027  CR LESS            TICHO     63 HBC
R2        0     0.006  CR LESS            HUBBARD   66 HBC

R3  *  XI 0 INTO(SIGMA+ E- NEU)/(LAMBDA PIO)                   (P4)/(P1)
R3  *     0     0.013  CR LESS            TICHO     63 HBC
R3        0     0.007  CR LESS            HUBBARD   66 HBC

R4  *     XI 0 INTO (SIGMA- E+ NEUTRINO)/TOTAL                 (P5)/TOTAL
R4  *     0     0.006  CR LESS            HUBBARD   66 HBC

R5  *     XI 0 INTO (SIGMA+ MU- NEUTRINO)/TOTAL                (P6)/TOTAL
R5  *     0     0.007  CR LESS            HUBBARD   66 HBC

R6  *     XI 0 INTO (SIGMA- MU+ NEUTRINO)/TOTAL                (P7)/TOTAL
R6  *     0     0.006  CR LESS            HUBBARD   66 HBC

R7  *     XI 0 INTO (PROTON MU- NEUTRINO)/TOTAL                (P8)/TOTAL
R7  *     0     0.006  CR LESS            HUBBARD   66 HBC

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23 XI 0 DECAY PARAMETER

```
A   *  ALPHA XI 0
A            -0.05      0.42          PJERROU   65 HBC
A   *        -0.149     0.154         BERGE     66 HBC
A      46    -0.2       0.4           LONDON    66 HBC  USING A-LAMB=0.62
A     490    -0.33      0.10          MERRILL   66 HBC  A-LAM=0.690+-.048
A                . . . . . . . . .
A   AVG       -.3106    .0945   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

F   *  PHI ANGLE XI0  (TAN(PHI)=BETA/GAMMA)  (DEGREE)
F   N  146   -2.9      23.5          BERGE     66 HBC
F   N  490   107.0     38.0          MERRILL   66 HBC  USING A-LAMB=0.642
F   N  THE LIKELIHOOD FUNCTION FOR COMBINED DATA IS VERY NON-GAUSSIAN. THE
F   N     DATA ARE CONSISTENT (2.2 S.D.) WITH PHI BETWEEN -25 AND +225 DEG.

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REFERENCES

23 XI 0(1314,JP=1/2)I=1/2

```
ALVAREZ   59 PRL 2 215          ALVAREZ,EBERHARD,GOOD,GRAZIANO,TICHO+//LRL
JAUNEAL   63 SIENA CONF 1 1     JAUNEAU+ ///// PARIS+CERN+LCND+RUTH+BERGEN
     ALSO 63 PL 4 49            JAUNEAU+ ///// PARIS+CERN+LCND+RUTH+BERGEN
TICHO     63 BNL CONF 410       HAROLD K TICHO ////////////////////////UCLA

CARMONY   64 PRL 12 482         CARMONY,PJERROU,SCHLEIN,SLATER,STORK+/UCLA
HUBBARD   64 PR 135 B 183       HUBBARD,BERGE,KALBFLEISCH,SHAFER +/////LRL
PJERROU   65 PRL 14 275         + SCHLEIN,SLATER,SMITH,STORK,TICHO // UCLA
PJERROU   65 THESIS             G M PJERROU ////////////////////////// UCLA

BERGE     66 PR  147  945       BERGE,EBERHARD,HUBBARD,MERRILL + ///// LRL
HUBBARD   66 UCRL 11510         J RICHARD HUBBARD (THESIS,BERKELEY) // LRL
LONDON    66 PR 143 1034        LONDON,RAU,GOLDBERG,LICHTMAN+//BNL+SYRACUS
MERRILL   66  BERKELEY CONF     MERRILL,SHAFER,BERGE               // LRL
     CF. 66 UCRL 16455          DEANE MERRILL (THESIS, BERKELEY) ///// LRL

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Ω^-

24 OMEGA- (1675,JP=3/2+) I=0

* QUANTUM NUMBERS ASSIGNED FROM SU3

24 OMEGA- MASS (MEV)

```
M   *     1 1620.0     25.0       10.0  EISENBERG 54 EMUL
M   S     1 1673.0      8.0             ABRAMS    64 HBC     INTO XI- PIO
M   S     1 1677.0      9.0             BARNES 1  64 HBC     INTO XIO PI-
M   *     BARNES 1 CHANGED FROM 1686+-12.0 BY SAMIOS 65
M   S     1 1674.0      3.0             BARNES 2  64 HBC      INTO LAMBDA K-
M   S     1 1666.0      8.0             COLLEY    65 HBC      INTO XIC PI-
M   S     1 1671.0      5.0             RICHARDSC 65 HBC      INTO LAMBDA K-
M   S     ABOVE EVENTS INCLUDED IN SAMIOS RVUE
M         6 1674.0      3.0             SAMIOS    65 RVUE
M         1 1674.0      2.0             COLLEY    67 HBC      INTO LAMBDA K-   11/67
M         1 1669.0      4.0             ABCLV COL 67 HBC      INTO LAMBDA K-
M         1 1678.0     14.0             ABCLV COL 67 HBC      INTO LAMBDA K-   11/67
M         1 1671.0      7.0             ABCLV COL 67 HBC      INTO LAMBDA K-   11/67
M         1 1670.0      2.0             ABCLV COL 67 HBC      INTO LAMBDA K-   11/67
M         3 1671.8      1.0             SCHULTZ   67 HBC      SEE NOTE C BELOW 11/67
M   C   ALL THREE SCHULTZ EVENTS DECAY K- LAMBDA
M                . . . . . . . . .
M   AVG     1671.9687    .7672   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

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MESON RESONANCES

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

24 OMEGA- LIFETIME (UNITS 10**-10 SEC)

T	A	1	1.63	ABRAMS	64 HBC		
T	A	1	0.7	BARNES 1	64 HBC		
T	A	1	1.4	BARNES 2	64 HBC		
T	A	1	1.85	COLLEY	65 HBC		
T	A	1	1.5	RICHARDSC	65 HBC		
T	A	1	0.93	ABCLV CCL	67 HBC		11/67
T	A	1	2.6	ABCLV CCL	67 HBC		11/67
T	A	ALLISON 66 INCLUDES ALL THE ABOVE + 5 OTHERS NOT LISTED HERE					
T		12	1.1	0.6	0.5	ALLISON	66 RVUE		11/67
T		1	1.6			ABCLV CCL	67 HBC		11/67
T		1	0.21			ABCLV CCL	67 HBC		11/67
T		1	1.20			SCHULTZ	67		11/67
T		1	0.06			SCHULTZ	67		11/67
T		1	0.63			SCHULTZ	67		11/67

24 OMEGA- PARTIAL DECAY MODES

P1	OMEGA- INTO LAMBDA K-		S18S10
P2	OMEGA- INTO XI 0 PI-		S23S 8
P3	OMEGA- INTO XI- PI 0		S22S 9

REFERENCES
24 OMEGA-(1675,JP=3/2+) I=0

EISENBER 54 PR 96 541 Y EISENBERG //////////////////////////CORNELL
ABRAMS 64 PRL 13 670 + BURNSTEIN,GLASSER + ///// MARYLAND+LSNRL
BARNES 1 64 PRL 12 204 V E BARNES,CONNOLLY,CRENNELL,CULWICK+//BNL
BARNES 2 64 PL 12 134 V E BARNES,CONNOLLY,CRENNELL,CULWICK+//BNL
COLLEY 65 PL 19 152 CCLLEY,COCD + // BIR+GLA+IC+MUN+OXF+RHEL
RICHARDS 65 BAPS 10 115 RICHARDSON,BARNES,CRENNEL+ // BNL+SYRACUSE
SAMIOS 65 ARGONNE CONF 189 N P SAMIOS //////////////////// (RVUE) BNL
ABCLV CC 67 SUBMITTED TO NP AACHEN+BERLIN+CERN+LONDON IMP.COLL.+VIENNA
ALLISON 66 PREPRINT J. ALLISON ////////////////////////// CXFORD
COLLEY 67 PRIV. COMM. FROM D.C.CCLLEY//BIRM+GLASG+LCN.IC+MUN+OXF+RHEL
SCHULTZ 67 PR TO BE PUB SCHULTZ+ /// ILL,ARGONNE,NORTHWESTERN,WISC

DATA ON MESON RESONANCES

CODE EVENTS QUANTITY ERROR+ ERROR- REFERENCE YR TECN SIGN COMMENTS ABOVE BACKGROUND — DATE PUNCHED

$\pi^{\pm}$

6 CHARGED PION (14C, JPG=G--) I=1

SEE LISTINGS OF STABLE PARTICLES

π^{0}

9 NEUTRAL PION (135, JPG=C--) I=1

SEE LISTINGS OF STABLE PARTICLES

$\sigma(410)$

7 SIGMA MESON (410, JPG=C++) I = C

* NO COMPELLING EVIDENCE FOR NARROW RESONANCE.
* OMITTED FROM TABLE.
* SEE NOTE ON SIGMA(410) AND EPSILON(7CC) BELOW

REFERENCES FOR SIGMA

SAMIOS 62 PRL 9 139 +BACHMAN,LEA+ /////////////// BNL+CCNY+CC+KY
BLOKHINT 63 JETP 17 80 BLOKHINTSEVA,GREIENNIK,ZHUKOV + // CUBNA
BOOTH + ARASHIAN ////////////////////// LRL
KIRZ 63 PR 130 2461 +SCHWARTZ + TRIPP ////////////////////// LRL
BARISH 64 PR 135 B 416 BARISH,KURZ,PEREZ-MENDEZ,SCLCMON // LRL
CRAWFORD 64 PRL 13 421 +GROSSMAN,LLOYD,PRICE,FOWLER ///////// LRL
DEL FABR 64 PRL 12 674 DEL FABRO,DE PRETIS,JONES+ FRASCATI
KALMUS 64 PRL 13 99 +KERNAN,PU,POWELL,COWD ///// LRL+WISCONSIN
BROWN 65 CORAL GABLES 219 BROWN+FAIER ////////////////// NORTHWESTERN
KOPELMAN 66 PL 22 118 +ALLEN,GOODEN,MARSHALL + // COLORADO+ICWA
LOVELACE 66 PL 22 332 LOVELACE,HEINZ,LONNACHIE // CERN
ANDERSON 67 PRL 18 89 +FUKUI+KESSLER+ // CHIC+ANL+CIT+MCGILL+CMC
MALAMUD 67 PRL 19 1056 E.MALAMUD + P.E.SCHLEIN ////////////// UCLA

FOR NEGATIVE EVIDENCE FROM PI PI PHASE SHIFT DETERMINATIONS, SEE

BIRGE 65 PR 139 B 1600 +ELY+GIDAL+KALMUS+CAMERINI+ ///// LRL+WISC
WOLF 65 PL 19 326 WOLF ////////////////////////////// DESY
BIRGE 66 BERKELEY CONF +ELY+GIDAL+HAGOPIAN+ / LRL+LONDON(UC)+WISC
JACOBS 66 PRL 16 669 +SELOVE ////////////////////////////// LRL
JONES 66 PL 21 596 +CALDWELL+ZACHAROV+HARTING+ELEULER+ / CERN
CORBETT 67 PR 156 1451 +CAMERELL+MICCLEMAS+NEWTON CXF+RLTHERF
WALKER 67 PRL 18 630 +CARRCLL,GARFINKEL,OH ////////// WISCONSIN

SEE ALSO DISCUSSION BY G. GOLDHABER, BERKELEY CONF. 1966, MESON REVIEW

η

14 ETA (549, JPG=0-+) I=0

SEE LISTINGS OF STABLE PARTICLES

ϵ (730)

14 EPSILON (730,JPG=0++) I=0

$\sigma(410)$ and $\epsilon(730)$

Narrow $J^P = 0^+$ pion pion resonances have been claimed at each of these energies, but the evidence is controversial.

There is, however, evidence from several studies of

$$\pi^- p \to n\pi^+\pi^-,\ n\pi^0\pi^0$$
$$\pi^+ p \to \Delta^{++}\pi^+\pi^-$$

that δ_{00} (the I=0, s-wave, $\pi\pi$ phase shift) is large and slowly varying between 400 and 600 MeV, and that it is large around 700 MeV.

The most complete and recent study is MALAMUD 67. Malamud and Schlein find three solutions for δ_{00}, two of which suggest a broad resonance at 730 MeV. The slightly preferred solution also hints at a lower resonance, e.g. the $\sigma(400)$.

14 EPSILON MASS (MEV)

M	F	700.0			FELDMAN 65 SPRK	1.52 PI- P	
M	F	NO EPSILON SEEN BY EUHLER 67 (IN EXPERIMENT AT SAME ENERGY).					11/67
M	F	FOR ANOTHER NEGATIVE RESULT SEE BUNIATOV 67					11/67
M		600.	APPROX.		CORBETT 67 SPRK	1.7-2.5 PI-P	7/67
M		730.	APPROX.		MALAMUD 67 RVUE	(PREFERRED SOLUT.)	7/67
M	P	20 709.	16.		STRUGALSK 67 HBC	2.3 PI+ N	7/67
M	P	PRELIMINARY RESULT					

14 EPSILON WIDTH (MEV)

W	F	50.0			FELDMAN 65 SPRK	(SEE NOTE F ABOVE)	
W		400.	APPROX.		CORBETT 67 SPRK	1.7-2.5 PI- P	7/67
W		150.	APPROX.		MALAMUD 67 RVUE	(PREFERRED SOLUT.)	7/67

REFERENCES FOR EPSILON

CLARK 65 PR 139 B1556 +CHRISTENSON+CRONIN+TURLAY ///// PRINCETON
COHN 65 PRL 15 906 P O COHN,BUGG+//CRNL+TENN+LNCAR+COLU+EFINS
DURAND 65 PRL 14 329 L. DURAND AND Y.T. CHIU /////////////// YALE
FELDMAN 65 PRL 14 869 FELDMAN,FRATI,HALPERN,CHCLERY+/PENNA+COLUM
FORINO 65 PL 19 65 +GESSAROLI,LENCINARA+ /// ECL+ORSAY+SACLAY
HAGOPIAN 65 PRL 14 1077 HAGOPIAN,SELOVE,ALIT+/PENNA+SACLAY+BOLOGNA
WOLF 65 PL 19 328 G WOLF ////////////////////////////// DESY

GOLDHABE 66 BERKELEY CONF 102 G.GOLDHABER, MESON REVIEW ////////////// LRL
JABLOL 66 PRL 17 1065 +JAMES+NGUYEN HUU KHANH /SACLAY+YALE+CRSAY
JACOBS 66 UCRL-16877 L.D.JACOBS ////////////////////////////// LRL
JONES 66 PL 21 596 +CALDWELL+ZACHAROV+HARTING+ELEULER+ / CERN
LOVELACE 66 PL 22 332 LOVELACE,HEINZ,LONNACHIE // CERN
OLSSON 66 PREPRINT MARTIN G. OLSSON ////////////////// WISCONSIN

BANDER 67 PR 155 1675 M.BANDER + G.L.SHAW ////////////////////// UCI
BUHLER 67 NC 49A 163 +ZALPIAZ,MASSAM,ZICHICHI+ // CERN+BOLOGNA
BUNIATOV 67 HEIDELBERG CONF. +ZAVATTINI,DEINET,MULLER+ //// CERN+KARLSR
CORBETT 67 PR 156 1451 +CAMERELL+MICCLEMAS+NEWTON CXF+RLTHERF
GUTAY 67 PR 161 1482 +JOHNSON+LOEFFLER+MCILWAIN+ // PURDUE+UCRL
JOHNSON 67 PREPRINT +EISNER+GUTAY+KLEIN+PETERS+SAHNI+ / PURDUE
MALAMUD 67 PRL 19 1056 E.MALAMUD + P.E.SCHLEIN /////////////// UCLA
STRUGALS 67 JINR E1-3100 STRUGALSKI+CHUVILO+IVANOVSKAJA+ //// DUBNA
SEE ALSO G. GOLDHABER, MESON REVIEW, PROC. 1966 BERKELEY CONF.
WALKER 67 PRL 18 630 +CARRCLL,GARFINKEL,OH ////////// WISCONSIN
WALKER 67 RMP 35 655 W.D.WALKER ////////////////////// WISCONSIN

$\rho(765)$

9 RHO (765,JPG=1-+) I=1

9 RHO MASS (MEV)

THERE ARE WIDE FLUCTUATIONS IN THE MEASURED VALUES FOR MASS AND WIDTH OF THE RHO. REPORTED MASS VALUES RANGE FROM 730 TO 780 MEV, DEPENDING ON TYPE OF REACTION AND ON KINEMATICS. WITHOUT A BETTER UNDERSTANDING OF PRODUCTION DYNAMICS, BACKGROUND INTERFERENCE AND FINAL STATE INTERACTIONS, THE DETERMINATION OF THE RHO MASS AND WIDTH WILL SUFFER FROM SYSTEMATIC UNCERTAINTIES WHICH SEEM TO BE OF THE ORDER OF AT LEAST 10 MEV.

NOTE IN PARTICULAR THE FOLLOWING ENTRIES.

AUSLANDER 67 (RHO 0 FROM E- E+ COLLIDING BEAMS)
BATON 67 (RHO - IN CHEW-LOW EXTRAPOLATION)
MALAMUD 67 (RHO 0 FROM PION-PION PHASE SHIFT ANALYSIS)
ROOS 67 (COMPILATION AND DISCUSSION OF RHO+-0 IN PI NUCL CCLL.)

M+	R	760.0	9.0		CARMONY 64 HBC	+	TCLT 4
M+		760.	10.		ARMENISE 65 HBC	+	
M+	R	765.0	5.0		ALFF-STEI 66 HBC	+ 2-3 PI+ P	
M+	*	783.0	6.0		JAMES 66 HBC	+ 2.1 PI+ P	
M+		756.0	10.0		JAMES 66 HBC		TCLT 2.5
M+		. . . . .					
M+	AVG	759.0000	7.0711	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			
M+	S	750.0	3.0		BALTAY 66 HBC	+- 0.0 PBARP	
M+		755.	10.		ALLES-BER 67 HBC	+- 5.7 PBAR P	12/66
M+		730.	11.		BARLOW 67 HBC	+- 1.2 PBAR P	11/66
M+		746.0	12.0		FOSTER 67 HBC	+- PBAR P AT REST	9/67
M+	A	774.	2.		ROOS 67 RVUE	+- PI N CL-2-BODY	7/67
M+	A	SEE ROOS 67 RVUE FOR DEPENDENCE ON MOM.TRANSFER AND TYPE OF REACTION					7/67
M+		. . . . .					
M+	AVG	744.8757	7.6124	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)			

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

```
M-  *      748.0                    KENNEY    62 HBC   -
M-  *  130 775.0                    GUIRAGOSS 63 HBC   -
M-  R      768.0      5.0           BLIEDEN   65 MMSP  -  3-5 PI- P
M-         772.0     19.0           FIDECARC  66 SPRK  -  2-5 PI-,T CUT18 11/66
M-  R      760.0      5.0           HAGOPIAN1 66 HBC   -  3-0 PI- P
M-  R      770.0      5.0           HAGOPIAN2 66 HBC   -  2-14 PI-P          9/67
M-  R      765.0      5.0           HAGOPIAN2 66 HBC   -  2-14 PI-P,LOW T    9/67
M-  R 1054 754.       5.            JACOBS    66 HBC   -  2-3 PI-,T CUT 6    1/67
M-  R      749.0      3.0           WEST      66 HBC   -  2-1 PI- P
M-         752.0     14.0           BANNER    67 MMS   -  1-8 PI-P,  C+MM    9/67
M-  C      755.0      5.0           BATON     67 HBC   -  2-8 PI- P          10/67
M-         751.       5.            CLEAR     67 HBC   -  3 PI- P            7/67
M-         764.       4.            EISNER    67 HBC   -  4-2 PI-P           9/67
M-  R      777.0      6.0           MILLER    67 HBC   -  2-7 PI-,T CUT 5
M-  R      775.0      5.0           MILLER    67 HBC   -  2-7 PI-,T CUT1C
M-  R      766.0      5.0           MILLER    67 HBC   -  2-7 PI-,T CUT2C
M-         . . . . . . . . .
M-  AVG    758.9347   4.4480   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)

MO  *  190 750.0      20.0          SAMIOS    62 HBC   C
MO  R  300 760.0      10.0          ABOLINS   63 HBC   C
MO  *  160 775.0                    GUIRAGOSS 63 HBC   C
MO  R  500 770.0      10.0          GOLDHABER 64 HBC   C
MO  *      735.0      10.0          ALVEA     65 DBC   C 2.2 K- P
MO         750.0                    CLARK     65 SPRK  C
MO  N      736.0                    CLARK     65 SPRK  C 1.5 PI- P
MO  N  AT PI PI SCATT.ANGLE OF 90 DEG.WITHOUT INTERFERENCE WITH NONRES.BACKGD
MO  M      753.0                    CLARK     65 SPRK  C 1.5 PI- P
MO  M  AT PI PI SCATT.ANGLE OF 90 DEG. ALLOWING FOR INTERF.WITH NONRES.BACKGD
MO         763.0                    GERACO    65 DBC   C 4.0 PI- P
MO  S      750.0     15.0           GLTAY     65 HBC   C 2.0 PI- P
MO         768.0     14.0           ACCENSI   66 HBC   C 5.7 PBARP
MO  R      750.0      5.0           ALFF-STEI 66 HBC   C 2-3 PI+ P
MO  S      751.       6.            BALTAY    66 HBC   C 0.0 PBARP
MO  S      773.0     12.0           CASON     66 HBC   C 7.0 PI- P
MO  R      775.0      5.0           HAGOPIAN1 66 HBC   C 3.0 PI- P
MO  R      770.0      5.0           HAGOPIAN2 66 HBC   C 2.14 PI-P          9/67
MO  R      770.       5.            HAGOPIAN2 66 HBC   C 2.1 PI-,TCUT 12    2/67
MO  R 1500 758.       5.            JACOBS    66 HBC   C 2-3 PI-,T CUT 4    1/67
MO  R      765.0      8.0           JAMES     66 HBC   C 2.1 PI+ P
MO  R      760.0      3.0           WEST      66 HBC   C 2.1 PI- P
MO  R      776.0      2.0           ARMENISE  67 OBC   C 5.1 PI+C           9/67
MO  S      764.0     11.0           AUSLANDER 67 SPRK  E+E- COLLID.BEAM 10/67
MO  R      768.0      2.0           BACON     67 HBC   C 1.7 PI-P           9/67
MO         745.       9.            BARLOW    67 HBC   C 1.2 PBAR P        11/66
MO         766.       3.            CLEAR     67 HBC   C 3 PI- P            7/67
MO      327 750.      10.            DANYSZ    67 HBC   C 3,3.6 PEAR P       7/67
MO  W  184 755.       5.            DANYSZ    67 HBC   C 3,3.6 PEAR P       7/67
MO  W    WIDTH UNUSUALLY SMALL
MO         781.       3.            EISNER    67 HBC   C 4.2 PI-P           9/67
MO         755.0     12.0           FOSTER    67 HBC   C PBAR P AT REST     9/67
MO  R      761.       3.            HUWE      67 HBC   C 2.4 PI- P          7/67
MO         766.       4.            LAMSA     67 HBC   C 8.0 PI-P          11/67
MO  C      765.0      4.0           MALAMUD   67 RVUE  C PI+P,SEE NOTE C    7/67
MO  C      767.0      2.0           MALAMUD   67 RVUE  C PI-P,SEE NOTE C    7/67
MO  R      770.0      4.0           MILLER    67 HBC   C 2.7 PI-,T CUT2C
MO         777.0      5.0           POIRIER   67 HBC   C 8.0 PI- P         11/67
MO  B      780.       2.            RODS      67 RVUE  C PI N CX-2-BODY     7/67
MO  B  SEE RODS 67 RVUE FOR DEPENDENCE ON MOM.TRANSFER AND TYPE OF REACTION  7/67
MO         . . . . . . . . .
MO  AVG    770.5145   3.5335   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)

MO  P      740.0      10.0          LANZEROTT 65 CNTR  C GAMMA P
MO  P      728.0       8.0          CAMBRIDGE 66 HBC   C 1.0-6.0 GAMMA P
MO  P      728.0       6.0          ERBE      67 HBC   C 3.5-5.5 GAMMA P
MO  P  IN GAMMA P TO RHO O P, THE RHO MASS APPEARS SHIFTED.
MO  P  FOR CORRECTED VALUES SEE BELOW.
MO  P      765.       5.            ASBURY 2  67 CNTR  C GAMMA + PB        8/67
MO  P      ASBURY 67 CORRECT FOR MASS DEPENDENCE OF PRODUCTION PROCESS
MO  P 1500 774.       3.            ERBE      67 HBC   C 1.4-5.8 GAMMA P    7/67
MO  P      ERBE 67 TAKE INTERFERING BACKGROUND INTO ACCOUNT.

M       290 755.0                   CHADWICK  63 HBC  +-C
M           730.0      5.0          CLAYTON   67 HBC     2.5 PI(BAR)P       9/67
M           744.       9.           FRENCH    67 HBC  +-C 3-4 PBAR P       6/67
M           . . . . . . . . .
M   AVG     733.3019   5.9434   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)

M       240 752.0                   ALITTI    63 HBC   -C
M           765.0                   LEE       65 HBC   -C

M   *   ----------NOTES----------

M   C   FROM CHEW-LOW EXTRAPOLATION
M   P   PHOTOPRODUCTION
M   C   FROM PHASE SHIFT ANALYSIS
M   R   INCLUDED IN RODS 67 RVUE
M   S   S-WAVE BREIT-WIGNER FIT, CANNOT BE COMBINED WITH OTHER VALUES

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                    $ RHO(0) - RHO(+-) MASS DIFFERENCE (MEV)

D   A        5.7       2.2          RODS      67 RVUE    PI N QUASI-2-BDY  7/67
D   A   ERROR STATISTICAL ONLY. SEE COMMENT ON RHO MASS ABOVE.

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                    $ RHO  WIDTH (MEV)

W   *   SEE NOTE ON RHO MASS ABOVE

W+          90.0      10.0          SACLAY    63 HBC   +
W+  R       77.0      20.0          CARMONY   64 HBC   +          TCUT 4
W+          160.      10.           ARMENISE  65 HBC   +
W+  R       100.0                   ALFF-STEI 66 HBC   +   2-3 PI+ P
W+  *       177.0      15.0         JAMES     66 HBC     + 2.1 PI+ P
W+          147.0      19.0         JAMES     66 HBC          TCUT 2.5
W+          . . . . . . . . .
W+  AVG     127.6764   23.7454  AVERAGE (ERROR INCLUDES SCALE FACTOR = 3.6)

W+  S       150.0      30.0          BALTAY    66 HBC   +-  0.0 PBARP
W+          146.       31.           ALLES-BCR 67 HBC   +-  5.7 PBAR P      12/66
W+          130.       25.           BARLOW    67 HBC   +- 1.2 PBAR P       11/66
W+          166.0      10.0          FOSTER    67 HBC   +-  PBAR P AT REST   9/67
W+          . . . . . . . . .
W+  AVG     159.7668   8.9020   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

W-  *  130  125.0                    GUIRAGOSS 63 HBC   -
W-     98   180.0                    BONDAR    64 HBC   -
W-  R       127.0      5.0           BLIEDEN   66 MMSP  -  3-5 PI- P
W-  R       150.0      20.0          HAGOPIAN1 66 HBC   -  3.0 PI- P
W-  R       130.0      20.0          HAGOPIAN2 66 HBC   -  2.14 PI-P          9/67
W-  R       135.0      20.0          HAGOPIAN2 66 HBC   -  2.14 PI-P,LOW T    9/67
W-  R 1054  146.       10.           JACOBS    66 HBC   -  2-3 PI-,T CUT 6    1/67
W-  R       149.0      13.0          WEST      66 HBC   -  2.1 PI- P
W-          100.0      30.0          BANNER    67 MMS   -  1.8 PI-P,  C+MM    9/67
W-  C       110.0       9.0          BATON     67 HBC   -  2.8 PI- P         10/67
W-          133.       11.           EISNER    67 HBC   -  4.2 PI-P           9/67
W-  R       137.0      17.0          MILLER    67 HBC   -  2.7 PI-,T CUT 5
W-  R       145.0      12.0          MILLER    67 HBC   -  2.7 PI-,T CUT1C
W-  R       153.0      13.0          MILLER    67 HBC   -  2.7 PI-,T CUT2C
W-          . . . . . . . . .
W-  AVG     129.0891   16.6660  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

WO  *  190  150.0      20.0          SAMIOS    62 HBC   C
WO  *  160  175.0                    GUIRAGOSS 63 HBC   C
WO  R  300   90.0      10.0          ABOLINS   63 HBC   C
WO  R   96  210.0                    BONDAR    64 HBC   C
WO  R  500  130.0                    GOLDHABER 64 HBC   C
WO          110.0      20.0          ALVEA     65 DBC   C 2.2 K- P
WO          130.0                    CLARK     65 SPRK  C
WO          150.0                    GERACO    65 HBC   C 4.0 PI- P
WO  S        80.0      15.0          GLTAY     65 HBC   C 2.0 PI- P
WO  P       150.0      10.0          LANZEROTT 65 CNTR  C
WO          72.0       30.0          ACCENSI   66 HBC   C 5.7 PBARP
WO  R       100.0                    ALFF-STEI 66 HBC   C 2-3 PI+ P
WO  S       174.       31.           BALTAY    66 HBC   C 0.0 PBARP
WO  P       175.0                    CAMBRIDGE 66 HBC   C 5-6 GAM P
WO  S        57.0      25.0    15.0  CASON     66 HBC   C 7.0 PI- P
WO  R       120.0      10.0          HAGOPIAN1 66 HBC   C 3.0 PI- P
WO  R       130.0      20.0          HAGOPIAN2 66 HBC   -  2.14 PI-P          9/67
WO  R       135.0      20.0          HAGOPIAN2 66 HBC   -  2.14 PI-P,LOW T    9/67
WO  R 1500  141.       10.           JACOBS    66 HBC   C 2-3 PI-,T CUT 4    1/67
WO  R       103.0      13.0          JAMES     66 HBC   C 2.1 PI+ P
WO  R       173.0      13.0          WEST      66 HBC   C 2.1 PI- P
WO  R       164.0       5.0          ARMENISE  67 OBC     5.1 PI+C           9/67
WO  P       130.       5.            ASBURY 2  67 CNTR  C GAMMA + PB         8/67
WO  P       ASBURY 67 CORRECT FOR MASS DEPENDENCE OF PRODUCTION PROCESS
WO  S        93.0      15.0          AUSLANDER 67 SPRK  E+E- COLLID.BEAM 10/67
WO  R       148.0       8.0          BACON     67 HBC   C 1.7 PI-P           9/67
WO           92.       42.           BARLOW    67 HBC   C 1.2 PBAR P        11/66
WO  P       150.0      30.0          BLECHSCHM 67 SPRK      GAMMA(H+C+AL)   10/67
WO      327 135.       25.           DANYSZ    67 HBC   C 3,3.6 PEAR P       7/67
WO  W  184  128.       15.           DANYSZ    67 HBC   C 3,3.6 PEAR P       7/67
WO  W    WIDTH UNUSUALLY SMALL
WO          166.       11.           EISNER    67 HBC   C 4.2 PI-P           9/67
WO          153.0      10.0          FOSTER    67 HBC   C PBAR P AT REST     9/67
WO  R       152.       15.           HUWE      67 HBC   C 2.4 PI- P          7/67
WO          111.       8.            LAMSA     67 HBC   C 8.0 PI-P          11/67
WO  C       149.0      5.0           MALAMUD   67 RVUE  C PI-P,SEE NOTE C    7/67
WO  C       154.0      8.0           MALAMUD   67 RVUE  C PI+P,SEE NOTE C    7/67
WO  R       160.0      15.0          MILLER    67 HBC   C 2.7 PI-,T CUT2C
WO          135.0      10.0          POIRIER   67 HBC   C 8.0 PI- P         11/67
WO          . . . . . . . . .
WO  AVG     133.0736   9.3518   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)

W       290 110.0                   CHADWICK  63 HBC  +-C
W           98.        30.          FRENCH    67 HBC  +-C 3-4 PBAR P      6/67

W           125.0      15.          LEE       65 HBC   -C

W   C       170.0                   WOLF      65 RVUE
W   A       128.       5.           RODS      67 RVUE  +-C PI N CX-2-BODY   7/67
W   A   THIS VALUE IS FROM COMBINED DATA ON NEUTRAL AND CHARGED RHOS. NO DE-  7/67
W   A   PENDENCE OF THE RHO WIDTH ON ITS CHARGE HAS BEEN DETECTED WITHIN THE  7/67
W   A   EXPERIMENTAL ACCURACIES OF ABOUT 10 MEV. SEE RODS 67 RVUE.           7/67

W   *   ----------NOTES----------

W   C   FROM CHEW-LOW EXTRAPOLATION
W   P   PHOTOPRODUCTION (SEE ALSO UNDER RHO 0 MASS)
W   C   FROM PHASE SHIFT ANALYSIS
W   R   INCLUDED IN RODS 67 RVUE
W   S   S-WAVE BREIT-WIGNER FIT, CANNOT BE COMBINED WITH OTHER VALUES

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                    $ RHO PARTIAL DECAY MODES

P1      RHO INTO 2PI                                          S 85 8
P2      RHO INTO 4PI                                          S 85 85 85 8
P3      RHO INTO PI GAMMA                                     S 85 0
P4      RHO INTO E+ E-                                        S 35 3
P5      RHO INTO PI ETA (VIOLATES G)                          S 8514
P6      RHO INTO MU+ MU-                                      S 45 4

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                    $ RHO BRANCHING RATIOS

R1  *   RHO INTO 4PI/2PI                                  (P2)/(P1)

R1  *   RHO+- INTO (PI+- PI+ PI- PI0) / (PI+- PIC)
R1          0.026 OR LESS           BLIEDEN   66 MMSP  -  3-5 PI- P
R1          0.01 OR LESS            DEUTSCHMA 66 HBC   +   8.0 PI+ P
R1          0.002 OR LESS           FERBEL    66 HBC   +- PI+- P ABOVE 2.5
R1          0.0035   0.004          JAMES     66 HBC   +                  11/66

R1  *   RHO 0 INTO  (PI+ PI- PI+ PI-) / (PI+ PI-)
R1          0.008 OR LESS           JAMES     66 HBC   C
R1          0.002 OR LESS           CHUNG     67 HBC   C 3.2,4.2 PI-P       7/67
R1          0.0015  OR LESS,CL=0.9  HILPERT   67 HBC     2.5-5.8 GAMMA P    10/67

R2  *   RHO INTO PI GAMMA/2PI                             (P3/P1)
R2          0.02  OR LESS           DAUBIN    64 HBC   +
R2  N       0.02 OR LESS            LANZEROTT 65 CNTR                      11/66
R2  N     ONE PION EXCHANGE MODEL USED IN THIS ESTIMATION
R2          0.005 OR LESS           FIDECARC  66 SPRK  - C.97 CONF LEV
R2          0.007 OR LESS           HUSCN     66 HLBC  -
R2  M       0.004 OR LESS           ERBE      67 HBC   C 3.5-5.5 GAMMA P
R2  M     ONE PION EXCHANGE MODEL USED IN THIS ESTIMATION

R3  *   RHO INTO(E+ E-)/(PI+PI-)    (UNITS 10**-4)        (P4)/(P1)
R3      94      0.65      0.14          ASBURY 1  67 CNTR    PHOTOPRODUCTION  9/67
R3      99      0.62      0.11          AUGUSTIN  67 SPRK    E+E- COLLID.BEAM 11/67
R3  *           0.49      0.08          AUSLANDER 67 SPRK    E+E- COLLID.BEAM 10/67
R3              0.65      1.1     0.5   HERTZBACH 67 SPRK  ASSUME SU(3)+MIXING
R3      13      0.39      0.12    0.39  KHACHATUR 67 SPRK  ASSUME SU(3)+MIXING  5/67
R3

R4  *   RHO INTO (PI ETA)/(2PI)                           (P5)/(P1)
R4          0.03 OR LESS            DEUTSCHMA 66 HBC   +   8.0 PI+ P
R4          0.008  OR LESS          FERBEL    66 HBC   +- PI+- P ABOVE 2.5 11/66

R5  *   RHO INTO (MU+ MU-)/(PI+ PI-) (UN 10**-4)          (P6)/(P1)
R5  C       0.33      0.16    0.07  DE PAGTER 66 CNTR    0 5.2 GAM P
R5  D     DE PAGTER 66 SUPERSEDED BY WEINSTEIN 67 BELOW
R5          14.0 OR LESS            HERTZBACH 67 SPRK
R5          0.97      0.31    0.33  HYAMS     67 SPRK    11 PI- LI H         6/67
R5          0.51      0.12          WEHMANN   67 SPRK    C 12 PI- CN C,FE    6/67
R5  W     A CORRECTION OF 11 PER CENT FOR CMEGA CONTAMINATION IN THE
R5  W     DATA OF WEHMANN 67 IS BASED ON SU(3).
R5          0.59      0.19          WEINSTEIN 67 CNTR    PHOTOPRODUCTION  10/67
R5          . . . . . . . . .
R5  AVG        .5751     .0899   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
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REFERENCES FOR RHO

ANDERSON 61 PRL 6 365   ANDERSON,BANG,BURKE,CARMONY,SCHMITZ // LRL
KENNEY   62 PR 126 736   V P KENNEY,W C SHEPHARD,C E GALL /KENTUCKY
SAMIOS   62 PRL 9 139   SAMIOS,BACHMAN,LEA+ // BNL+CCNY+COLUM+KENT
XUONG   62 PR 128 1849   NGUYEN HUU XUONG,GERALD R LYNCH ////// LRL

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

MESON RESONANCES

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ABOLINS  63 PRL 11 381          ABOLINS,LANCER,MEHLHOP,NGLYEN,YAGER / UCSD
ALITTI   63 NC 29 515           ALITTI,BATON,ARMENISE+/SAC+CRSAY+BARI+BOLO
CHADWICK 63 PRL 10 62           CHADWICK,CAVIES,CERRICK,CRESTI + / CXF+PAD
GUIRAGOS 63 PRL 11 85           ZAVEN GUIRAGOSSIAN ////////////////// LRL
SACLAY   63 SIENA CONF 1 239    SACLAY+ORSAY+BARI + BOLOGNA(COLLABORATION)

BATON    64 NC 35 713           BATON,BERTHELOT,ALLES,BORELLI + /CEN+BOLOG
BONDAR   64 NC 31 729           BONDAR+//AACHEN+BIRM+BONN+CESY+IMP-COL+MPI
CARMONY  64 DUBNA CONF 1 486    CARMONY,HOA,LANDER,NG H XLONG,YAGER //UCSD
DAUDIN   64 REPORT CEA-R-2525   DAUDIN,JABICL,MCNGELLI + ///// SACLAY+BARI
GOLCHABE 64 PRL 12 336          GOLCHABER,BROWN,KADYK,SHEN,TRILLING/LRL+UC

ALYEA    65 PL 15 82            ALYEA,CRITTENDEN,MARTIN,RHODE + // INDIANA
ARMENISE 65 NC 37 361           SACLAY+CRSAY+BARI+BOLOGNA (COLLABORATION )
BLIEDEN  65 PL 19 444           CERN MISSING MASS SPECTROMETER GROUP//CERN
CLARK    65 PR 139 B 1556       A CLARK,CHRISTENSON,CRONIN,TURLAY/PRINCETO
DERADO   65 PRL 14 872          DERADO,KENNEY,PCIRIER,SHEPPARD//NOTRE DAME
GUTAY    65 NC 39 381           GUTAY,LANNUTTI,TLLI ////////////// FLORIDA
LANZEROT 65 PRL 15 210          LANZEROTTI,BLUMENTHAL,EHN,FAISSLER +/+ARVD
LEE      65 MICH 04938          YCNG-YUNG LEE ////////////////////// MICHIGAN
WOLF     65 PL 19 328           G WOLF ////////////////////////////// DESY
ZDANIS   65 PRL 14 721          ZDANIS,MADANSKY,KRAEMER + //////// JHU+BNL

ACCENSI  66 PL 20 557           ACCENSI,ALLES-BORELLI,FRENCH,FRISK+// CERN
ALFF-STE 66 PR 145 1072         ALFF-STEINBERGER,BERLEY,BRLGGER+//COL+RUTG
BALTAY   66 PR 145 1103         +FRANZINI,LUTJENS,SEVERINS,TYCKO+/COLUMBIA
BLIEDEN  66 NC 43 71            CERN MISSING MASS SPECTROMETER GROUP//CERN
CAMBRIDG 66 PR  146  994        CAMBRIDGE BUBBLE CHAMBER GROUP //MIT+HARV+
CASON    66 PR  148  1282       N M CASON                      // WISCONSIN
DE PAGTE 66 PRL 16 35           DE PAGTER+//CAM EL ACC+MIT+NORTH-EAST+ SLAC
DEUTSCHM 66 PL 20 82            DEUTSCHMANN,STEINBERG +//AACH+BERLIN+ CERN
FERBEL   66 PL 21 111           FERBEL ////////////////////////// ROCHESTER
FIDECARO 66 PL  23  163         G+M FIDECARO,J PCIRIER,P SCHIAVON  // CERN
HAGOPIA1 66 PR 145 1128         HAGOPIAN,SELOVE,ALITTI,BATON+//PENN+SACLAY
HAGOPIA2 66 PR  152  1183       HAGOPIAN,PAN  // PENNSYLVANIA+LRL-BERKELEY
HUSON    66 PL 20 91            HUSON,ALLARD,DRIJARD,HENNESSY + //ORSAY+EP
JACOBS   66  UCRL-16877         L.D.JACOBS ////////////////////////////// LRL
JAMES    66 PR 142 896          F E JAMES,KRAYBILL /////// YALE+BROOKHAVEN
WEST     66 PR 149 1089         WEST,BOYD,ERWIN,WALKER ///////// WISCONSIN

ALLES-BO 67 NC 50 A 776         ALLES-BORELLI,FRENCH,FRISK,+ /// CERN+BONN
ARMENISE 67  HEIDELBERG CONF.   +GHIDINI,FORINO+//BARI+BOLOGN+FIRENZ+CRSAY
ASBURY 1 67 PRL 19 869          +BECKER+BERTRAM+JOOS+JORDAN+TING+/DESY+COL
ASBURY 2 67 PRL 19 865          +BECKER+BERTRAM+JOOS+JORDAN+TING+/DESY+COL
AUGUSTIN 67  PREPRINT LAL1181   +BIZOT+BUON+HAISSINSKI+LALANNE+  /// CRSAY
AUSLANDE 67 PL 25 B 433         ALSLANDER,BUCKER,PESTOV,SICCROV+/NOVOSIBIR
   ALSO 67  HEIDELBERG CONF.    (CUCTED IN RAP.TALK BY M. JEOS)
BANNER   67 PL  25 B  300       +FAYOLX,HAMEL,JSEMBERY,PCHEZE+//SACLAY+CAEN
BACON    67 PR 157 1263         +FICKINGER,HILL,HOPKINS,ROBINSON+   // BNL
BARLOW   67 NC 50A 761          +LILLESTOL+MONTANET+/CERN+CCF+IR+LIVERPOOL
BATON    67 PL 25 B 419         J.BATON,G.LAURENS,J.REIGNIER    //  SACLAY
   ALSO 67 NP B 3  349
BLECHSCH 67  HEIDELBERG CONF.   BLECHSCHMIDT,DOKE,ELSNER,HEINLOTH+ // DESY
CHUNG    67  UCRL-16881         S.U.CHUNG,O.I.DAHL,J.KIRZ,G.H.MILLER / LRL
CLAYTON  67  HEIDELBERG CONF.   +MASON,MURHEAD,FILIPPAS+ //  LPOOL+ATHENS
CLEAR    67 NC 49A 399          +JOHNSTON+COOPER+MANNER+WALKER+/TO+ANL+WIS
DANYSZ   67 NC TO BE PUBL.      DANYSZ+FRENCH+SIMAK ////////////////// CERN
EISNER   67 PR TO BE PUBL.      +JOHNSON+KLEIN+PETERS+SAHNI+YEN+ // PURDUE
ERBE     67 NC 48A 262          +BOTTCHER+MCEBES+HARIGEL+LLKE+ /// ABEDHM
FRENCH   67  CERN/TC/PH.66-31   +KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
FOSTER   67  HEIDELBERG CONF.   +CAVILLET,LABROSSE,MONTANET+  //  CERN+CDF
HERTZBAC 67 PR 155  1461        HERTZBACH,KRAEMER,MACANSKI,ZDANIS+/JHU+BNL
   (SEE ALSO ZDANIS 65)
HILPERT  67  HEIDELBERG CONF.   HILPERT+// AACH+BERL+BONN+MAMB+HEID+MUNICH
HUWE     67 PL 24B 252          +MARGLIT+OPPENHEIMER+SCHULTZ+WILSON // COL
HYAMS    67 PL 24B 634          +KOCH+PELLETT+PCITER+VONLINGERN+ /CERN+MUN
KHACHATL 67 PL 24B 349          K+KACHATURYAN+AZIMOV+BALDIN+BELOUSOV+/CUBNA
LAMSA    67  PREPRINT            +CASON+BISWAS+DERADO+GROVES+ /// NOTREDAME
MALAMUD  67  HEIDELBERG CONF.   +SCHLEIN,TRIPPE,BROWN,GICAL   //  UCLA+LRL
MILLER   67 PR 153 1423         MILLER,GUTAY,JOHNSON,LOEFFLER +  // PURDUE
POIRIER  67  PREPRINT           +BISWAS,CASON,DERADO,KENNEY+//NOTRDAM+PENN
ROOS     67 NP B 2  615         M. ROOS                          // CERN
WEHMANN  67 PRL 18 929          +ENGELS+ /// HARVARD+CWRL+SLAC+CORN+MCGILL
WEINSTEI 67  SLAC SYMPOSIUM     R.WEINSTEIN,RAP.TALK //// CEA+NORTHEASTERN
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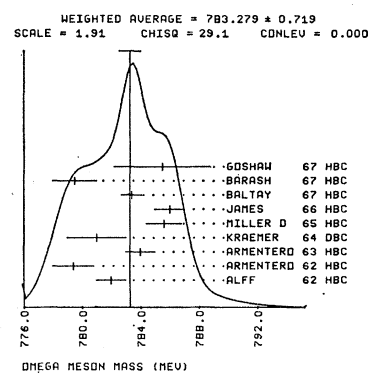
$\omega(783)$

1 OMEGA (783,JPG=1--) I=C

1 OMEGA MASS (MEV)

```
M      400  782.0      1.0          ALFF      62 HBC
M       64  779.4      1.4          ARMENTERC 62 HBC
M      650  782.0                   MURRAY    63 HBC
M       34  784.0      1.0          ARMENTERO 63 HBC
M      220  781.0      2.0          KRAEMER   64 DBC
M           785.6      1.2          MILLER D  65 HBC    SEEN WITH K+K-
M   K       780.8      2.0          MILLER D  65 HBC    SEEN WITH K1 K1
M   P       DATA INCLUDED IN BARASH 67 BELOW
M      333  786.0      1.0          JAMES     66 HBC
M     2198  783.4      0.7          BALTAY    67 HBC    0.0 PBAR P
M      155  779.5      1.5          BARASH    67 HBC    0 PBAR TO K1K1CM  11/66
M           784.0      2.8          CLAYTON   67 HBC     2.5 P(BAR)P       9/67
M           785.5      3.3          GOSHAW    67 HBC    3.5 K+ P           7/67
M   *       782.0      5.0          JACQUET   67 HLBC                      10/67
M   *       784.8      1.1          KEY       67 HBC   -  3 PI-P          11/67
M   AVG     783.2515    .6729   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.8)
                (SEE IDEOGRAM)
```



1 OMEGA FULL WIDTH (MEV)

```
W       34    9.0      3.0          ARMENTERC 63 HBC
W            13.4      2.0          MILLER D  65 HBC    SEEN WITH K+ K-
W   M        11.6      3.0          MILLER D  65 HBC     SEEN WITH K1 K1
W   P        DATA INCLUDED IN BARASH 67 BELOW
W      333   20.0   CR LESS          JAMES     66 HBC
W      155   12.3      2.0          BARASH    67 HBC    SEEN WITH K1 K1
W
W   AVG      12.1500   1.2792   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
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1 OMEGA PARTIAL DECAY MODES

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P1     OMEGA INTO PI+ PI- PIO                                  S 85 85 9
P2     OMEGA INTO PI+ PI- (VIOLATES G)                         S 85 8
P3     OMEGA INTO PI+ PI- GAMMA                                S 85 85 0
P4     OMEGA INTO PIO GAMMA                                    S 9S 0
P5     OMEGA INTO 2PIC GAMMA                                   S 9S 9S 0
P6     OMEGA INTO MU+ MU-                                      S 4S 4
P7     OMEGA INTO E+ E-                                        S 3S 3
P8     OMEGA INTO ETA GAMMA                                    S14S 0
P9     OMEGA INTO ETA PIO (VIOLATES C)                         S14S 9
P10    OMEGA INTO 3 GAMMA                                      S 0S 0S 0
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1 OMEGA BRANCHING RATIOS

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R1   *  OMEGA INTO NEUTRAL/(PI+ PI- PIO)                    (P4+P5)/(P1)
R1          0.17      0.04          ARMENTERC 63 HBC
R1      20  0.11      0.02          BUSCHBECK 63 HBC
R1      35  0.08      0.03          KRAEMER   64 DBC
R1   *      0.13      0.035         MILLER D  65 HBC
R1      65  0.10      0.04          ALFF-STEI 66 HBC CORR.BY SCHLITZ(COL)
R1     850  0.134     0.026         DIGIUGNC  66 CNTR
R1     348  0.057     0.016         FLATTE    66 HBC
R1          0.06      0.05    0.02  JAMES     66 HBC
R1      19  0.10      0.03          BARASH    67 HBC                    7/67
R1       . . . . . . . . .
R1   AVG        .1043     .0091   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R2   *  OMEGA INTO (PI+ PI-)/(PI+ PI- PIC)                  (P2)/(P1)
R2          0.010 OR LESS         BUTTON    62 HBC
R2          0.07                  ALITTI    63 HBC
R2          0.05 OR LESS          ARMENTERC 63 HBC
R2     100  0.05 OR GREATER       FICKINGER 63 HBC
R2          0.05 OR LESS          KRAEMER   64 DBC
R2   *      0.005 OR LESS         LUTJENS   64 RVUE NC INTERFERENCE
R2          0.018     0.012   0.006 WALKER    64 RVUE
R2          0.04 OR GREATER       BATON     65 HBC
R2          0.010 OR LESS         CLARK     65 SPRK
R2          0.035 OR LESS         MILLER D  65 HBC
R2          0.02 OR LESS          ALFF-STEI 66 HBC                    11/66
R2          0.029     0.011   0.009 FLATTE    66 HBC  INTERFERENCE
R2   *      0.082     0.020         FLATTE    66 HBC  NC INTERFERENCE
R2   *      0.07      0.06    0.11  ROOS      67 RVUE  NC INTERF.  T-LT-1C  7/67
R2          0.017     0.035   0.026 ROOS      67 RVUE  INTERF.     T-LT-1C  7/67
R2   *      0.00      0.01          ROOS      67 RVUE  NC INTERF.  T=1C-3C  7/67
R2          0.12      0.04    0.22  ROOS      67 RVUE  INTERF.     T=1C-3C  7/67
R2       . . . . . . . . .
R2   AVG        .0229     .0065   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

R3   *  OMEGA INTO (PIC GAMMA) / (PI+ PI- PIO)              (P4)/(P1)
R3   *      0.125     0.025         BARMIN    64 PXBC
R3   N  13  0.15      0.06          BAGLIN    66 HLBC
R3   N      BAGLIN 66 SUPERSEDED BY JACQUET 67 BELOW                    10/67
R3          0.13      0.04          JACQUET   67 HLBC                   10/67

R4   *  OMEGA INTO (PI+ PI- GAMMA)/(PI+ PI- PIC)             (P3)/(P1)
R4          0.05   OR LESS          FLATTE    66 HBC

R5   *  OMEGA INTO(E+ E-)/(PI+ PI- PIO)  (UNITS 10**-3)  (P7)/(P1)
R5   *      3.9       1.5     CR LESS BARMIN    63 PBC
R5       1  2.8    CR LESS           BEZAGUET  64 FBC
R5       3  0.20      0.12          BINNIE    65 SPRK
R5          1.4    CR LESS          GALTIERI  65 HBC
R5          0.3 OR LESS             FLATTE    66 HBC
R5   A  20  0.11      0.03          AZIMOV    66 SPRK     4 PI- P
R5   A      RESULT GOT CHANGED BY MORE THAN 1 S.D.(SEE KHACHATURIAN 67)    5/67
R5          0.10      0.17    0.075 HERTZBACH 67 SPRK ASSUME SU(3)+MIXING
R5      13  0.048     0.015   0.048 KHACHATLR 67 SPRK ASSUME SU(3)+MIXING  5/67
R5

R6   *  OMEGA INTO (MU+ MU-)/(PI+ PI- PIC)(UNITS 10**-3) (P6)/(P1)
R6          1.2    CR LESS          GALTIERI  69 HBC
R6          1.7 OR LESS             FLATTE    66 HBC

R7   *  OMEGA INTO (2PIO GAMM)/(PIO GAMMA)                  (P5)/(P4)
R7          0.1    OR LESS          BARMIN    64 PXBC

R8   *  OMEGA INTO(ETA PIO +ETA GAM)/(PI+PI-PIC)           (P8+P9)/(P1)
R8          0.017  OR LESS          FLATTE    66 HBC
R8          0.026 OR LESS           JACQUET   67 HLBC    CL=0.9C           10/67

R9   *  OMEGA INTO (NEUTRALS) / (CHARGED)
R9          0.124     0.021         FELDMAN   67 SPRK     1.2 PI- P         3/67

R10  *  OMEGA INTO (2PIO GAMMA)/(PI+PI-PIO)                 (P5)/(P1)
R10         0.1    OR LESS          JACQUET   67 HLBC    CL=0.90           10/67

R11  *  OMEGA INTO (3 GAMMA)/(PIC GAMMA)                    (P10)/(P4)
R11  *      0.35   OR LESS          KANAREK   66 XEBC                      11/67
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REFERENCES FOR OMEGA


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MAGLIC   61 PRL 7 178           B MAGLIC,ALVAREZ,ROSENFELD,STEVENSON //LRL
PEVSNER  61 PRL 7 421           PEVSNER,KRAEMER,NUSSBAUM,RICHARD+///JHU+NW
XUONG    61 PRL 7 327           NGUYEN HUU XUONG,GERALD R LYNCH /////  LRL
ALFF     62 PRL 9 325           ALFF,BERLEY,COLLEY,GELFAND +//COLU+RUTGERS
ARMENTER 62 CERN CONF 90        R ARMENTEROS,R BLOCH + // CERN+COLL+FRANCE
BUTTON   62 PR 126 1858         BUTTON,KALBFLEISCH,LYNCH,MAGLIC + ///  LRL
STEVENSO 62 PR 125 687          STEVENSON,ALVAREZ,MAGLIC,ROSENFELD /// LRL

ALITTI   63 NC 29 515           ALITTI,BATON,BERTHELOT+//LPCPE+PAR+BARI+BC
ARMENTER 63 SIENA CONF 1 296    ARMENTEROS,EDWARDS,JACOBSEN+ // CERN+PARIS
BARMIN   63 SIENA CONF 1 207    BARMIN,COLGOLENKO,KRESTNIKOV+ //////  ITEP
BERTHELO 63 SIENA CONF 2 60     A BERTHELOT ////////////////////// CEN-SACLAY
BUSCHBEC 63 SIENA CONF 1 166    BUSCHBECK,CZAPP+ /// VIENNA+CERN+AMSTERDAM
FICKINGE 63 PRL 10 457          W J FICKINGER,D K ROBINSON,E SALANT // BNL
GELFAND  63 PRL 11 436          GELFAND,MILLER,NUSSBAUM,RATAU+ /COLUM+RUTG
MURRAY   63 PL 7 358            MURRAY,FERROLUZZI,HUWE,SHAFER,SOLMITZ+/LRL

BARMIN   64 JETP 18 1289        BARMIN,COLGOLENKO,KRESTNIKOV + /////  ITEP
BEZAGUET 64 PL 12 70            BEZAGUET,NGUYEN KHAC,ROUSSET+//PAR+BERG+LC
KRAEMER  64 PR 136 B 496        KRAEMER,MADANSKY,MEER,FIELDS+//JHU+NW+WOOD
LUTJENS  64 PRL 12 517          G LUTJENS,J STEINBERGER ///////  COLUMBIA
WALKER   64 PL 8 208            WALKER,BOYD,ERWIN,SATTERLEE +// WISCONSIN
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED

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BATCN    65 NC 35 713          BATCN,BERTHELOT,CELER,BENEDETTI+/SAC+BGLOG
BINNIE   65 PL 18 346          BINNIE,CUANE,JANE,W JONES+//IC-LOND+MANCHS
CLARK    65 PR 139 B 1556      CLARK,CHRISTENSCN,CRONIN,TURLAY//PRINCETON
GALTIERI 65 PRL 14 279         A BARBARO GALTIERI,R C TRIPP ///////// LRL
MILLER C 65 CU-237(NEVIS 131)  DAVID C MILLER  (THESIS) /////// CGLUMBIA
   MILLER 65 INCLUDES DATA OF  GELFAND 63 ABOVE
ZDANIS   65 PRL 14 721         ZDANIS,MACANSKY,KRAEMER,HERTZBACH+/JHL+BNL

ALFF-STE 66 PR 145 1072        ALFF-STEINBERGER,BERLEY,BRLGGER+//CCL+RUTG
AZIMOV   66 BERKELEY CONF.     AZIMOV,BALDIN,BELOUSOV,CHLVILO + //  CUBNA
BAGLIN   66 PL  23  266        +BEZAQUET,DEGRANCE,MAATUFT +  // EPA+BERGEN
DIGILGNC 66 NC 44A 1272        CI GILGNO,PERUZZI,TROTSE+ //NAPL+FRAS+TRST
FLATTE   66 PR  145  1050      +FUKE,MURRAY,BUTTCN-SHAFER,SCLMITZ+ // LRL
JAMES    66 PR 142 896         F E JAMES,KRAYBILL //////  YALE+BROOKHAVEN
KANAREK  66  PREPRINT P1-2948  +LOSKEVICH,MARTYNCV,NICHIPCRUK+  //  CUBNA

BALTAY   67 PRL  18  93        +FRANZINI,SEVERIENS,YEH,ZANELLO //CCLLMBIA
BARASH   67 PR  156  1399      BARASH,KIRSCH,MILLER,TAN /////////COLLMBIA
CLAYTON  67  HEIDELBERG CONF.  +MASON,MUIRHEAC,FILIPPAS+ //  LPOOL+ATHENS
FELDMAN  67 PR 155 1219        +FRATI,GLEESON,HALPERN,NUSSBAUM+ /// PENNA
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG /////////////// WISC
HERTZBAC 67 PR 155, 1461       HERTZBACH,KRAEMER,MACANSKI,ZDANIS+/JHL+BNL
   (SEE ALSC ZDANIS 65)
JACQUET  67  HEIDELBERG CONF.  +NGUYEN-KHAC,BAGLIN,MAATUFT+ // EPP+BERGEN
KEY      67  PREPRINT         +FRENTICE+GCCPER+MANNER+WALKER+/TG+ANL+WIS
KHACHATL 67 PL 24B 349         KHACHATURYAN+AZIMOV+BALDIN+BELOUSOV+/CUBNA
ROOS     67 NP B 2  615        M. ROOS                              // CERN

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$\eta'(958)$

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2   ETA PRIME (S5E,JPG=0-+)  I=C

KNOWN EARLIER AS XC OR ETA*

2   ETA PRIME MASS (MEV)

M   *   85  957.0                    DAUBER    64 HBC
M           958.0      1.0           KALBFLEIS 64 HBC
M           957.0      3.0           BADIER    65 HBC
M       8   960.0      2.0           TRILLING  65 HBC      3.65 PI+ P
M       7   955.0     10.0           COHN      66 BBC
M           959.0      3.0           LONDON    66 HBC
M           . . . . . . . .
M   AVG     958.3171   .6214   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)

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2   ETA PRIME WIDTH (MEV)

W       85    4.0 OR LESS            DAUBER    64 HBC
W             7.0 OR LESS            KALBFLEIS 64 HBC
W            30.0 OR LESS            BADIER    65 HBC
W            15.0 OR LESS            LONDON    66 HBC

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2   ETA PRIME PARTIAL DECAY MODES

P1          ETA PRIME INTO  PI+ PI- ETA(NEUTRAL DECAY)     S 8S 8S14
P2          ETA PRIME INTO  PI+ PI- ETA(CHARGED DECAY)     S 8S 8S14
P3          ETA PRIME INTO  PI+ PI- NEUTRALS
                            (EXCLUDING  PI+ PI- ETA(NEUTRAL DECAY))
P4          ETA PRIME INTO  NEUTRALS                       S 9S 9S 9
P5          ETA PRIME INTO  PI+ PI- GAMMA (INCL. RHC GAM)  S 8S 8S G
P6          ETA PRIME INTO  PIO E+ E- (VIOLATES C IN       S 9S 3S 3
                                      BCRN APPROX.)
P7          ETA PRIME INTO  ETA E+ E- (VIOLATES C IN       S14S 3S 3
                                      BCRN APPROX.)
P8          ETA PRIME INTO  PIO RHC C (VIOLATES C)         S 9U 9
P9          ETA PRIME INTO  PIO CMEGA (VIOLATES C)         S 9U 1
P10         ETA PRIME INTO  PI+ PI- E+ E-                  S 8S 8S 3S 3
P11         ETA PRIME INTO  2 PI                           S 8S 8
P12         ETA PRIME INTO  3 PI                           S 8S 8S 9
P13         ETA PRIME INTO  4 PI                           S 8S 8S 8S 8
P14         ETA PRIME INTO  6 PI                           S 8S 8S 8S 8S 8S 8
P15         ETA PRIME INTO  PIC GAMMA GAMMA                S 9S 0S C

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2   ETA PRIME BRANCHING RATIOS

R1  *       ETA PRIME INTO (PI+ PI- ETA (NEUTRAL DEC.))  NUM 1
R1  *                        / TOTAL                     DEN 12345
R1          68    0.36      0.05          KALBFLEIS 64 HBC
R1          . . . . . . . . .
R1  FIT         .329      .027    VALUE FROM CONSTRAINED FIT

R2  *       ETA PRIME INTO (PI+ PI- NEUTRALS) / TOTAL    NUM 1 3
R2  *                                                    DEN 12345
R2          33    0.35      0.06          BADIER    65 HBC
R2          39    0.4       0.1           LONDON    66 HBC
R2          . . . . . . . . .
R2  AVG         .3632     .0514   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R2  FIT         .388      .027    VALUE FROM CONSTRAINED FIT

R3  *       ETA PRIME INTO (PI+ PI- ETA (CHRGD.DECAY))   NUM  2
R3  *                        / TOTAL                     DEN 12345
R3          44    0.12      0.02          KALBFLEIS 64 HBC
R3           7    0.07      0.04          BADIER    65 HBC
R3          10    0.1       0.04          LONDON    66 HBC
R3          . . . . . . . . .
R3  AVG         .1083     .0163   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R3  FIT         .120      .010    VALUE FROM CONSTRAINED FIT

R4  *       ETA PRIME INTO (PI+ PI- NEUTRALS (EXCLUDING  NUM  3
R4  *       PI+ PI- ETA (NEUTR.DEC.))) / TOTAL           DEN 12345
R4          10    0.05      0.04          KALBFLEIS 64 HBC
R4          . . . . . . . . .
R4  FIT         .059      .029    VALUE FROM CONSTRAINED FIT

R5  *       ETA PRIME INTO (NEUTRALS) / TOTAL            NUM  4
R5  *                                                    DEN 12345
R5          54    0.25      0.05          KALBFLEIS 64 HBC
R5          16    0.24      0.17          BADIER    65 HBC
R5          32    0.3       0.1           LONDON    66 HBC
R5          . . . . . . . . .
R5  AVG         .2587     .0432   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R5  FIT         .273      .034    VALUE FROM CONSTRAINED FIT

R6  *       ETA PRIME INTO (PI+ PI- GAMMA (INCLUDING     NUM  5
R6  *                      RHC GAMMA)) / TOTAL           DEN 12345
R6  *       THIS MODE SEEMS TO BE CONSISTENT WITH BEING ENTIRELY RHO GAMMA
R6          42    0.22      0.04          KALBFLEIS 64 HBC
R6  B   35    0.34      0.09          BADIER    65 HBC
R6  B       CONTROVERSIAL BACKGROUND SUBTRACTION
R6          20    0.2       0.1           LONDON    66 HBC
R6          . . . . . . . . .
R6  AVG         .2172     .0371   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)
R6  FIT         .219      .029    VALUE FROM CONSTRAINED FIT

R7  *       ETA PRIME INTO (PI+ PI- GAMMA (INCLUDING     NUM  5
R7  *                      RHO GAMMA)) /(PI PI ETA)      DEN 1234
R7              0.25      0.14          DAUBER    64 HBC
R7          . . . . . . . . .
R7  FIT         .328      .068    VALUE FROM CONSTRAINED FIT

R8  *       ETA PRIME INTO (PIC E+ E-)/TOTAL             NUM      6
R8              0.013  CR LESS         RITTENBER 65 HBC  DEN 12345

R9  *       ETA PRIME INTO (ETA E+ E-)/TOTAL             NUM      7
R9              0.011  CR LESS         RITTENBER 65 HBC  DEN 12345

R10 *       ETA PRIME INTO (PIO RHCO)/TOTAL              NUM      8
R10             0.04   CR LESS         RITTENBER 65 HBC  DEN 12345

R11 *       ETA PRIME INTO (PIO CMEGA) /TOTAL            NUM      9
R11             0.08   CR LESS         RITTENBER 65 HBC  DEN 12345

R12 *       ETA PRIME INTO (PI+ PI- E+ E-)/TOTAL         NUM      0
R12             0.006  CR LESS         RITTENBER 65 HBC  DEN 12345

R13 *       ETA PRIME INTO (2 PI)/TOTAL                  NUM      1
R13             0.07   CR LESS  CCMP.BY LONDON    66 HBC  DEN 12345

R14 *       ETA PRIME INTO (3 PI)/TOTAL                  NUM      2
R14             0.07   CR LESS  CCMP.BY LONDON    66 HBC  DEN 12345

R15 *       ETA PRIME INTO (4 PI)/TOTAL                  NUM      3
R15             0.01   CR LESS  CCMP.BY LONDON    66 HBC  DEN 12345

R16 *       ETA PRIME INTO (6 PI)/TOTAL                  NUM      4
R16             0.01   CR LESS  CCMP.BY LONDON    66 HBC  DEN 12345

R17 *       ETA PRIME INTO (PIO GAMMA GAMMA) / TOTAL     NUM      5
R17 *                                                    DEN 12345
R17 *   21 (POSSIBLY SEEN (PRELIM.))  STRLGALSK 67 HLBC    2.3 PI+ A        7/67
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η' branching ratios

Only two partial decay modes of the η' have been established, namely, $\eta' \to \eta\pi\pi$ and $\eta' \to \pi^+\pi^-\gamma$. (This electromagnetic mode may be mainly $\rho^0\gamma$.) In addition a recent experiment indicates a possible $\eta' \to \pi^0\gamma\gamma$ decay. In calculating the constrained branching fractions, in a previous edition of this data summary (RMP 39, 1(1967); see note on η' branching ratios on p. 23) we assumed that only the $\eta\pi\pi$ and $\pi^+\pi^-\gamma$ decay modes are present, and therefore that $\eta' \to$ (all neutrals) is entirely due to $\eta' \to \pi^0\pi^0\eta$, with $\eta \to$ (neutrals). We now feel, however, compelled to determine the branching fractions without this assumption. This results in the values given in the Meson Table. In the fit we have not used the constraint $\Gamma(\eta' \to \eta\pi^+\pi^-)/\Gamma(\eta' \to \eta\pi^0\pi^0) = 2$ from I-spin conservation, although the results of the fit are in perfect agreement with it (the ratio actually being 2.0 ± 0.2).

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                        REFERENCES FOR ETA PRIME

DAUBER    64 PRL 13 449         DAUBER,SLATER,SMITH,STORK,TICHO ///// UCLA
   ALSC 64 DUBNA CONF 1 418     DAUBER,SLATER,L T SMITH,STORK,TICHO //UCLA
KALBFLEI 64 PRL 13 349         G.R.KALBFLEISCH,C.DAHL,A.RITTENBERG // LRL

BADIER    65 PL 17 337         BADIER,DEVOLLIN,BARLOUTALE +/PAR+SAC+ZEEMA
KIENZLE   65 PL 19 436         KIENZLE,MAGLIC,LEVRAT,LEFEBVRES + /// CERN
RITTENBE 65 PRL 15 556         RITTENBERG,KALBFLEISCH //////////  LRL+BNL
TRILLING 65 PRL 19 427         +BROWN,GOLDHABERS,KADYK,SCANIO       // LRL

COHN      66 PL 21 367         COHN,MCCULLOCH,ELGG,CONDC//CRNL+TENN+LNCAR
LONDON    66 PR 143 1034       LONDON,RAU,SAMICS,GOLDBERG +//BRL+SYRACUSE

STRLGALSK 67  JINR E1-3100     STRLGALSKI+CHLVILC+IVANCVSKAJA+ //// CUBNA

        QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

GALTIERI 67  UCRL-17614        GALTIERI,MATTISCN,RITTENBERG ///////// LRL I=C
MARTIN    66 PL 22,352         MARTIN,CRITTENDEN,SCHROEDER   // INDIANA L I
HOOGLAND 67  HEIDELBERG CONF.  +KLUYVER+/ZEEMAN+BOLOGNA+EPP+WEIZMANN+SACL I=C

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$\delta(963)$

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36  DELTA MESON (963,JPG=   )  I = 1,2

*               CONFIRMATION STILL LACKING.

36  DELTA (963) MASS (MEV)

M   N       910.                      TURKOT    63 MMS  +  3.3 PP TC D + PP
M   N       AT EDGE OF PHASE SPACE. AUTHORS DID NOT CLAIM A RESONANCE.
M       262 962.0      5.0            KIENZLE   65 MMS  -  3-5 PI- P
M   B       NOTE THAT BANNER 1 AT 1.8 PI-P DOES NOT SEE IT.
M   A   36  965.0                      ALLEN     66 HBC  -  1.7 PI- P
M   A  106  965.0      COMPILATION BY  ALLEN     66 HBC  +-0 1-8 PI  P
M   A       FOR RESULTS WHICH CONTRADICT ALLEN &&,
M   A       SEE JACOBS 66, WEST 66, BANNER1 67, CLEAR 67, AND ROOS 67.
M   C       966.0      8.0            OCSTENS   66 MMS  +  3.6 PP TC D + PP
M   C       FOR A CONTRADICTORY RESULT SEE BANNER2 67       3.8 PP TC D + PP 11/67
M   *
M   V   NOTE THAT THE PI(1016) AS SEEN BY ASTIER 67, IF INTERPRETED AS A   11/67
M   V   VIRTUAL BOUND STATE RESONANCE, WOULD CORRESPOND TO A NARROW RESO-  11/67
M   V   NANCE OF M = 975 (+15/-10) MEV.                                    11/67

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36  DELTA (963) WIDTH (MEV)

W   N       50.                       TURKOT    63 MMS  +  SEE NOTE N ABOVE
W       262   5.0   CR LESS           KIENZLE   65 MMS  -  3-5 PI- P
W   A   36  25.    CR LESS           ALLEN     66 HBC  -  SEE NOTE A ABOVE
W   C       10.0   CR LESS           OCSTENS   66 MMS  +  SEE NOTE C ABOVE

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36  DELTA MESON PARTIAL DECAY MODES

P1          DELTA MESON INTO 2 PI                          S 8S 8
P2          DELTA MESON INTO 3 PI                          S 9S 9S 9
P3          DELTA MESON INTO 4 PI                          S 9S 9S 9S 9
P4          DELTA MESON INTO 5 PI
P5          DELTA MESON INTO ETA PI                        S14S 9
P6          DELTA MESON INTO RHO PI                        L 9S 9

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36  DELTA MESON BRANCHING RATIOS

R1          CHARGED DELTA INTO (1 CHARGED) / (3 OR MORE CHARGED)
R1              1.3       0.9       0.7   KIENZLE   65 MMS  -  3-5 PI- P

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

36 SIGMA(MICROB.) FOR PI- P -- P X-

CS	*	15 +- 5 BRANCH.RATIO ABOVE.KIENZLE	65	MMS	-	3-5 PI-			7/67
CS	*	KIENZLE 15. REVISED TO A FEW...FOCACCI	66	MMS	-	3-5 PI-			7/67
CS		17 OR LESS (2 PRONGS) JACOBS	66	HBC	-	3.2 PI-			7/67
CS		3.0 OR LESS /(GEV/C)**2 BANNER 1	67	MMS	-	1.6 PI-P, P+PP			9/67
CS		3.3 +- 1.7 PI- PI+ PI- ETA CHUNG	67	HBC					7/67
CS		.2 OR LESS PI- PI+ PI- KP CHUNG	67	HBC	-	3.2-4.2 PI-			7/67
CS		1.5OR LESS PI- PI+ PI- PIO CHUNG	67	HBC	-	3.2 PI-			7/67
CS		14+-6 OR LESS HCOGLANC	67	DBC	-	3 K-O,LMEDA+P+PP			9/67

REFERENCES FOR DELTA(963)

TURKOT	63 SIENNA CONF 1 661	+COLLINS,FUJII,KEPP+ ////// BNL+PITTSBURGH	
KIENZLE	65 PL 15 438	+ MAGLIC,LEVRAT,LEFEBVRES + // CERN	
ALLEN C	66 PL 22 543	+CP FISHER,G COCCONI,L MARSHALL,SEARS//CCLC G=+	
FOCACCI	66 PL 17 89C	+ KIENZLE,LEVRAT,MAGLIC,MARTIN // CERN	
OOSTENS	66 PL 22 708	+CHAVANON,CROZON,TOCQUEVILLE // SACLAY,CF I=1	
ASTIER	67 PL 25 B 294	+MONTANET,BAUBILLIER,DUBOC+ //CDF+CERN+IDR	

REFERENCES AGAINST 2PI DECAYS OF DELTA(963)

JACOBS	66 UCRL 16877-THESIS	+C.DAHL, J. KIRZ, D.H.MILLER //////// LRL
WEST	66 PR 149 1089	WEST,BOYD,ERWIN,WALKER ////////// WISCONSIN
CLEAR	67 NC 49A 399	+JOHNSTON+PILCHER+COOPER+/TCRONTO+ANL+WISC
ROOS	67 NP B 2 615	M. ROOS // CERN

REFERENCES AGAINST DELTA(963)

BANNER 1	67 PL 25 B 300	+FAYGLX,HAMEL,ZSEMBERY,CHEZE+//SACLAY+CAEN
BANNER 2	67 PL 25 B 569	+CHEZE,HAMEL,MAREL,TEIGER,CROZON+/CDF+SACL
CHUNG S	67 UCRL 16881	+C.DAHL, J. KIRZ, D.H.MILLER //////// LRL
HOOGLAND	67 HEIDELBERG CONF.	HCOGLANL+/ZEEMAN+BOLOGNA+EPF+WEIZMANN+SACL

H(990)

35 H (990, JPG= -) I=0

FOR COMPILATION SEE APPENDIX A OF JANUARY 1967 EDITION (RMP 39, 1) OF THIS DATA SUMMARY.

35 H MASS (MEV)

M	C	50 975.0	15.0	BARTSCH	64 HBC	4.0 PI+ P			
M	C	30 975.0	APPROX	GOLDHABER	65 HBC	3.65 PI+P			
M	C	30 958.	10.	BENSON	66 DBC	3.65 PI+D			
M	C	EXPERIMENTS ABOVE COMPILED IN JAN 67 EDITION (RMP 39,1)							
M		996.	APPROX.	CHADWICK	67 DBC	2.1,2.6 K- D			11/67
M		980.	APPROX.	COHN	67 DBC	3.3 PI+ D			1/67

35 H WIDTH (MEV)

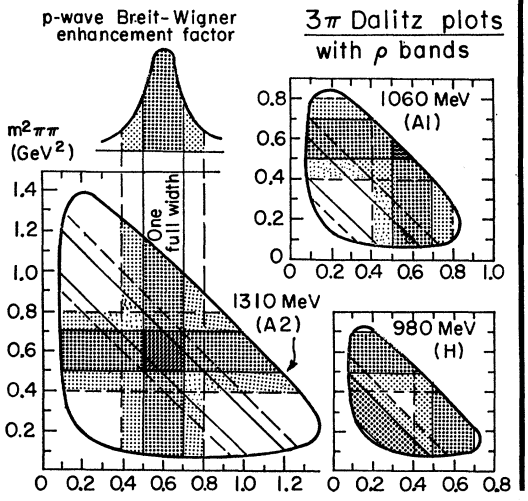
W	C	90 120.0		BARTSCH	64 HBC	4.0 PI+ P			
W	C	30 45.0	30.C	BENSON	66 DBC	3.65 PI+ D			
W	C	EXPERIMENTS ABOVE COMPILED IN JAN 67 EDITION (RMP 39,1)							
W		55.	CR LESS	CHADWICK	67 DBC	2.1,2.6 K- D			11/67
W		60.	CR LESS	COHN	67 DBC	3.3 PI+ D			1/67

35 H PARTIAL DECAY MODES

P1	H INTO 3 PI	S 8S 8S S
P2	H INTO RHO PI	L 9S 8

H MESON CROSS SECTION (MICROBARNS)

CS		75.0	15.0	BENSON	66 CBC	3.65 PI+D TO PPP			
CS		50.		COHN	67 DBC	3.3 PI+D TO PPP			1/67



Dalitz plots for three-pion states of total mass 980 MeV, 1060 MeV, and 1310 MeV, illustrating the overlap of the ρ bands.

REFERENCES FOR H MESON

BARTSCH	64 PL 11 167	AACHEN-ZEUTHEN-BIRM-BONN-HAMB-MUNCHEN COLL
GOLDHABE	65 CGRAL GABLES P 76	G. GOLDHABER // LRL
BENSON	66 PRL 17 1234	+MARGLIT,ROE,SINCLAIR,VANDER VELDE / MICH. IJP
	BENSON 66 ANALYSIS FAVORS JP=1+	
GOLDHABE 66	BERKELEY CONF	G.GOLDHABER,SAMIOS,ASTIER,SHEN,LAT.MESON REVIEW
ARMENISE 67	HEIDELBERG CONF.	+CHICINI,FORINO+//BARI+BOLOGN+FIRENZ+CRSAY
CHADWICK 67	SLAC-PUB-347	+GUIRAGOSSIAN+PICKUP+GALTIERI+ // SLAC+LRL I=C
COHN	67 NP B1 57	+MC CLELLOCH,BUGG,CONLO // CAK R.+UNIV.TENN
ROSENFEL	67 RMP 39 1	ROSENFELD,BARBARC-GALTIERI+/LRL+CERN+YALE

π_V(1016)

16 PI(1016,JPG=C+-) I=1

STILL NOT DECIDED WHETHER (K KBAR) RESONANCE, VIRTUAL BOUND STATE OR ANTIBOUND STATE.

16 PI(1016) MASS (MEV)

M	*	143 1003.3	7.C+SYSTEMATIC	ROSENFELD	65 RVUE	+-			
M		SCAT. LENGTH 2 TO 6 FERMIS.		BALTAY	66 HBC		3.7 PBAR P		
M		SCAT. LENGTH 2.5+-.5 FERMI		BARLOW	66 HBC	+-	1.2 PBAR P		11/66
M	A	100 1016. 10.		ASTIER	67 HBC	+-	0 PBAR P		7/67
M	A	SCATT.LENGTH ALSO FITS, SEE BELOW							
M		SCATT.LENGTH +2.5 +-1. FERMI		ASTIER	67 HBC	+-	0-1.2 PBAR P		7/67
M		CR CMPLX, RE PART=-2.3 F		.....	.. ...	..	....		7/67
M		IM PART=.5F OR LESS		.....	.. ...	..	....		7/67

16 PI(1016) WIDTH (MEV)

W	*	143 57.0	13.C+SYSTEMATIC	ROSENFELD	65 RVUE	+-			
W	A	100 25.	5.0	ASTIER	67 HBC	+-	SEE NOTE A ABOVE		9/67

16 PI(1016) PARTIAL DECAY MODES

P1	PI(1016) INTO K KBAR	S10S11
P2	PI(1016) INTO ETA PI	S14S 8

16 PI(1016) BRANCHING RATIOS

R1	*	PI(1016) INTO (ETA PI) / (K KBAR)				NUM 2			
R1	*					DEN 1			
R1		3.0	CR LESS	FOSTER	67 HBC		C. PBAR P		9/67

REFERENCES FOR PI(1016)

ARMENTER 65	PL 17 344	ARMENTEROS,EDWARDS,JACOBSEN +///CERN+PARIS
BARASH	65 PR 139 B 1659	+FRANZINI,KIRSCH,MILLER,STEINBERGER+/COLUM
ROSENFEL	65 OXFORC CONF 58	A H ROSENFELD ////////////////// LRL--RVUE
BALTAY	66 PR 142 B 932	+LACH,SANDWEISS,TAFT,YEH,STONEHILL+ //YALE
ASTIER	67 PL 25 B 294	+MONTANET,BAUBILLIER,DUBOC+ //CDF+CERN+IDR
ASTIER	67 INCLUDES DATA OF CONFORTO 67 AND ARMENTEROS 65	
BAILLON	67 NC 50A 393	+EDWARDS+C.ANDLAU+ASTIER+ /// CERN+CDF +IR
BARLOW	67 NC 50 A 701	+MONTANET,D-ANDLAU+/CERN+CDF+IDR+LIVERPCOL
CONFORTO	67 CERN 67-11 TC NP	CONFORTO,MARECHAL,MONTANET+/CERN+PARIS+LIV
FOSTER	67 HEIDELBERG CONF.	+GAVILLET,LABROSSE, MONTANET+ // CERN+CDF

ϕ(1019)

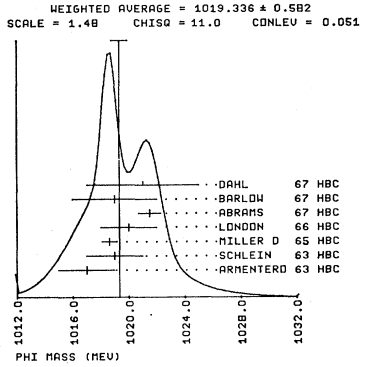
4 PHI (1019,JPG=1--) I=C

4 PHI MASS (MEV)

M		1017.0	2.0	ARMENTERO	63 HBC				
M		1019.0	2.0	SCHLEIN	63 HBC	2.0 K- P			
M		1018.6	0.5	MILLER D	65 HBC				
M		1020.0	2.0	LONDON	66 HBC				
M		1021.5	0.8	ABRAMS	67 HBC	4.2 K- P			11/67
M		1019.	3.	BARLOW	67 HBC	1.2 PBAR P			11/66
M		1021.0	4.0	DAHL	67 HBC	1-4 PI- P			
M		. . . . .							
M	AVG	1019.3363	.5824	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)					
		(SEE ICEOGRAM)							

4 PHI WIDTH (MEV)

W		3.4	1.7	ARMENTERO	63 HBC				
W	34	5.0	CR LESS	SCHLEIN	63 HBC				
W		3.5	1.0	MILLER D	65 HBC				
W		6.0	4.0	LONDON	66 HBC				
W		1.8	3.0	1.5	ABRAMS	67 HBC	4.2 K- P		11/67
W		10.	CR LESS		BARLOW	67 HBC	1.2 PBAR P		11/66
W		. . . . .							
W	AVG	3.3667	.7891	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

4 PHI PARTIAL DECAY MODES

P1	PHI INTO K+ K-			S1CS10
P2	PHI INTO KC1 KC2			S11S11
P3	PHI INTO PI+ PI- PIO (INCLUDING RHO PI)			S 8S 8S 9
P4	PHI INTO PI+ PI- (VIOLATES G)			S 8S 8
P5	PHI INTO E+ E-			S 3S 3
P6	PHI INTO ML+ ML-			S 4S 4
P7	PHI INTO PIO GAMMA			S 9S 0
P8	PHI INTO ETA GAMMA			S14S 0
P9	PHI INTO PI+PI-GAMMA			S 8S 8S 0
P10	PHI INTO OMEGA GAMMA (VIOLATES C)			L 1S 0
P11	PHI INTO ETA PIO (VIOLATES C)			S14S 9
P12	PHI INTO RHO GAMMA (VIOLATES C)			L 9S 0

4 PHI BRANCHING RATICS

R1	*	PHI INTO (K+ K-)/TOTAL				NUM 1	
R1	*					DEN 123	
R1	B 27	0.26	0.06	BADIER	65 HBC	(SEE NOTE B BELOW)	
R1	252	0.48	0.04	LINDSEY	66 HBC		
R1		* * * * * * * * *					
R1	FIT	.473	.032	VALLE FROM CONSTRAINED FIT			
R2	*	PHI INTO (K1 K2)/TOTAL				NUM 2	
R2	*					DEN 123	
R2	B 25	0.23	0.06	BADIER	65 HBC	(SEE NOTE B BELOW)	
R2	167	0.46	0.04	LINDSEY	66 HBC		
R2		* * * * * * * * *					
R2	FIT	.389	.031	VALLE FROM CONSTRAINED FIT			
R3	*	PHI INTO (PI+ PI- PIC (INCL.RHO PI))/TOTAL				NUM 3	
R3	*					DEN 123	
R3	B 57	0.51	0.09	BADIER	65 HBC		
R3	B	CONTROVERSIAL BACKGROUND SUBTRACTION					
R3	30	0.12	0.08	LINDSEY	66 HBC		
R3		* * * * * * * * *					
R3	FIT	.138	.043	VALLE FROM CONSTRAINED FIT			
R5	*	PHI INTO (K1 K2)/(K KBAR)				NUM 2	
R5	*					DEN 12	
R5	10	0.40	0.10	SCHLEIN	63 HBC		
R5	52	0.48	0.07	BADIER	65 HBC		11/67
R5		0.44	0.07	LONDON	66 HBC		
R5		* * * * * * * * *					
R5	AVG	.4482	.0444	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			
R5	FIT	.452	.026	VALLE FROM CONSTRAINED FIT			
R6	*	PHI INTO (PI+ PI- PIC (INCL.RHO PI))/(K KBAR)				NUM 3	
R6	*					DEN 12	
R6		0.30	0.15	LONDON	66 HBC		
R6		* * * * * * * * *					
R6	FIT	.160	.058	VALLE FROM CONSTRAINED FIT			
R7	*	PHI INTO (PI+ PI- PIC (INCL.RHO PI))/(K1 K2)				NUM 3	
R7	*					DEN 2	
R7		0.3	CR LESS	BERLEY	65 HBC		
R8	*	PHI INTO (PI+ PI-)/(K KBAR)				NUM 4	
R8	*					DEN 12	
R8		0.2	CR LESS	LONDON	66 HBC		
R9	*	PHI INTO (E+ E-)/(K KBAR)				NUM 5	
R9	*					DEN 12	
R9		0.0036 CK LESS		GALTIERI	65 HBC		
R9		INDICATION SEEN		HERTZBACH	67 SPRK		7/67
R9		0.002 CR LESS		KHACHATUR	67 SPRK		
R10	*	PHI INTO (MU+ MU-)/(K KBAR)				NUM 6	
R10	*					DEN 12	
R10		0.0053 CR LESS		GALTIERI	65 HBC		
R10		SEEN		WEHMANN	67 SPRK	12 K- CA C,FE	6/67
R11	*	PHI INTO (ETA GAMMA)/TOTAL				NUM E	
R11	*					DEN 123	
R11		0.2 CR LESS		BADIER	65 HBC		
R11		0.08 CK LESS		LINDSEY	66 HBC		
R12	*	PHI INTO (PI+ PI- GAMMA)/(K KBAR)				NUM 9	
R12	*					DEN 12	
R12		0.05 CR LESS		LINDSEY	65 HBC		
R13	*	PHI INTO (ETA NEUTRALS)/(K KBAR)				NUM E 1	
R13	*					DEN 12	
R13		0.15 CR LESS		LINDSEY	66 HBC		
R14	*	PHI INTO (OMEGA GAMMA) / TOTAL				NUM O	
R14	*					DEN 123	
R14		0.05 CR LESS		LINDSEY	66 HBC		
R15	*	PHI INTO (RHO GAMMA) / TOTAL				NUM 2	
R15	*					DEN 123	
R15		0.02 CR LESS		LINDSEY	66 HBC		
R16	*	PHI INTO (E+ E-)/TOTAL				NUM 5	
R16	*					DEN 123	
R16		0.002 CR LESS		BINNIE	67 SPRK	CL=0.95	10/67

REFERENCES FOR PHI

BERTANZA 62 PRL 9 180	BERTANZA,BRISSON,CONNOLLY,HART + //BNL+SYR
ARMENTER 63 SIENA CONF 2 70	ARMENTEROS,EDWARES,ASTIER+//CERN+CDF-PARIS
GELFAND 63 PRL 11 438	GELFAND,MILLER,NUSSBAUM,KIRSCH+//COLU+RUTG
GELFAND 63 DATA INCLUDED IN MILLER 65 BELOW	
SCHLEIN 63 PRL 10 368	SCHLEIN,SLATER,SMITH,STORK,TICHO //// UCLA
BADIER 65 PL 17 337	BADIER,DEVOLLIN,BARLOUTAUD+//PAR+LPCPE+ZEE
BERLEY 65 PR 139 B 1097	D BERLEY,N GELFAND ////////// BNL+COLUMBIA
GALTIERI 65 PRL 14 279	A BARBARO GALTIERI,R D TRIPP ////////// LRL
LINDSEY 65 PRL 15 221	JAMES S LINDSEY,GERALD A SMITH /////// LRL
LINDSEY 65 DATA INCLUDED IN LINDSEY 66 BELOW	
MILLER D 65 CU-237(NEVIS 131)	DAVID C MILLER (THESIS) //////// COLUMBIA
LINDSEY 66 PR 147 913	JAMES S LINDSEY, GERALD A SMITH //// LRL
LINDSEY1 66 PL 20 93	J.S.LINDSEY, G.A.SMITH ///.////////// LRL
LINDSEY 1 66 DATA INCLUDED IN LINDSEY 66 ABOVE	
LONDON 66 PR 143 1034	LONDON,RAL,SAMIES,GOLDBERG +//BNL+SYRACUSE
ABRAMS 67 MD TECH REP 720	GERALD ABRAMS , THESIS ////////// MARYLAND
BARLOW 67 NC 50A 701	+LILLESTOL+MONTANET+/CERN+CDF+IR+LIVERPOOL
BINNIE 67 HEIDELBERG CONF.	+DUANE,HORSEY,JONES,MASON,RAHMAN+/ICL+RHEL
DAHL 67 UCRL-16578	+HARDY+HESS+KIRZ+MILLER ////////////// LRL
HERTZBAC 67 PR 155 1461	HERTZBACH,KRAEMER,MADANSKI,ZDANIS+/JHL+BNL
KHACHATU 67 PL 24B 349	KHACHATURYAN+AZIMOV+BALDIN+BELOUSOV+/DUBNA
WEHMANN 67 PRL 18 929	+ENGELS+ /// HARVARD+CWRL+SLAC+CORN+MCGILL

QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN THE DATA CARDS

GRAY, L 66 PRL 17 501	+HAGERTY,BIZZARRI,CIAPETTI + // SYR+ROME JPC

$\eta\nu(1070)$

3 ETA (1070,JPC=0++)I=0

NAMED S* BY CRENNELL ET AL.
SOME DATA STILL FAVOR LARGE S-WAVE K KBAR SCATTERING LENGTH.

3 ETA (1070) MASS (MEV)

M	*	1000.0	APPROX	BINGHAM	62 HBC		
M	*	1000.0	APPROX	BIGI	62 HBC		
M	*	1000.0		ERWIN	62 HBC		
M	*	30 1030.0	APPROX.	BALTAY	64 HBC		
M	*	1025.0	APPROX.	BARMIN	64 HLBC		
M		20 1068.0	10.0	CRENNELL	66 HBC	6.0 PI- P	
M	H	120 SCATT.LENGTH FITS BETTER.		HESS	66 HBC	1.6-4.2 PI- P	
M		35 1045.	9.	BARLOW	67 HBC	1.2 PBAR P	11/66
M		730 1079.0	6.0 5.0	BEUSCH	67 SPRK	5,7,12 PI-P	9/67
M	P	70 1090.0	10.0	BIRD	67 SPRK	3.2 PI-P,PI+PI-N	10/67
M	P	PI+PI- MODE					
M							

(SEE IDEOGRAM)

3 ETA (1070) WIDTH (MEV)

W		20 80.0	15.0	CRENNELL	66 HBC		
W		35 50.	24.	BARLOW	67 HBC	1.2 PBAR P	11/66
W	S	168.0	21.0 19.0	BEUSCH	67 SPRK	5,7,12 PI-P	9/67
W	S	ASSUME NO S WAVE SCATTERING LENGTH.WITH S WAVE THE WIDTH IS NARROWER					
W	P	25.0	CR LESS	BIRD	67 SPRK	3.2 PI-P,PI+PI-N	10/67
W	P	PI+PI- MODE					
W							

3 ETA (1070) PARTIAL DECAY MODES

P1	ETA (1070) INTO KKBAR	S1CS11
P2	ETA (1070) INTO PIPI	S 8S 9

3 ETA (1070) BRANCHING RATICS.

R1	*	ETA (1070) INTO (PI PI)/(K KBAR)				(P1)/(P2)	
R1		2.5 CR LESS		CRENNELL	66 HBC	90 PCT CONF LEV	

REFERENCES FOR ETA(1070)

BIGI 62 CERN CONF 247	A BIGI,S BRANDT, R CARRARA + /////// CERN
BINGHAM 62 CERN CONF 240	H H BINGHAM,M BLOCH + //PARIS+EC POLY+CERN
ERWIN 62 PRL 9 34	ERWIN,HOYER,MARCH,WALKER,WANGLER //WIS+BNL
BALTAY 64 DUBNA CONF 1 409	BALTAY,LACH,CRENNELL,OREN,STUMP +/YALE+BNL
BARMIN 64 DUBNA CONF 1 433	BARMIN,GOLOLENKO,YEROFEEV,KRESTNI+// ITEP
CRENNELL 66 PRL 16 1025	CRENNELL,KALBFLEISCH,LAI,SCARR,SCHUH + //BNL
HESS 66 PRL 17 1109	+CAHL+HARDY+KIRZ+MILLER /////////////// LRL
HESS REPLACES PRL 9 460	ALEXANDER,DAHL,JACOBS,KALBFLEISCH + // LRL
BARLOW 67 NC 50A 701	+LILLESTOL+MONTANET+/CERN+CDF+IR+LIVERPOOL
BEUSCH 67 PL 25 B 357	+FISCHER,GOBBI,STEURY,MICHELINI+/ETH+CERN
BIRD 67 HEIDELBERG CONF.	+WHITEHEAD,ALLD+//AERE+RHEL+STHAMPT+LC.LON
DAHL 67 UCRL-16578	+HARDY+HESS+KIRZ+MILLER /////////////// LRL

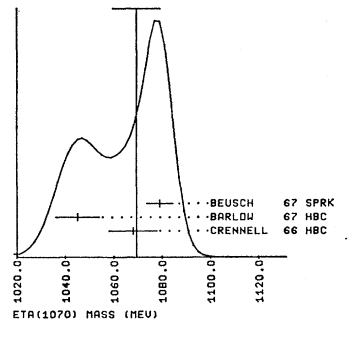
A 1 (1080)

1C A1 MESON (1CPS, JPC=1+-) I=1

1C A1 MESON MASS (MEV)

M	*	MASS AND WIDTH MIGHT HAVE LARGE SYSTEMATIC					
M	*	ERRORS DUE TO COMPLICATED BEHAVIOUR OF BACKGROUND.					
M		1080.0		ACERBOLZ	64 HBC		
M	A	1076.0	14.0	DEUTSCH 2	66 HBC	+	
M	A	NOT SUPPORTED BY ADDITIONAL DATA (MORRISON 67)					
M		1090. APPROX.		CHUNG	67 HBC	- 3.2,4.2 PI-P	2/67
M	C	1126. APPROX.		CONTE 1	67 HBC	- 11 PI- P	8/67
M	C	BACKGND SUBTRCTN DIFFICULT. REPLACED BY CONTE 2 BELOW.					
M		1088.0	10.0	CONTE 2	67 HBC	- 11.0 PI- P	10/67
M		1054.	7.	DANYSZ	67 HBC	+- 3,3.6 PBAR P	7/67
M	*	1020. PRELIM.		FRIEDMAN	67 HBC	+- 5.7 PBAR P	7/67
M	*	1105.0		MCCLELAND	67 HBC	O 3.0 K-P TO LAMB	9/67
M	K	1119.	30.	KEY	67 HBC	- 3 PI-P	11/67
M	K	SHOULDER ON A2 ONLY					
M							

WEIGHTED AVERAGE = 1069.44 ± 9.70
SCALE = 2.28 CHISQ = 10.4 CONLEV = 0.005



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

1G A1 MESON WIDTH (MEV)

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W   *   SEE NOTE UNDER A1 MESON MASS.

W            80.0                    ADERHOLZ  64 HBC
W   A       130.0      50.0    40.0  DEUTSCH 2 66 HBC   +
W   A       NOT SUPPORTED BY ADDITIONAL DATA (MORRISON 67)
W           125.     APPROX.          CHUNG     67 HBC   -  3.2,4.2 PI-P      2/67
W   C       130.     APPROX.          CONTE 1   67 HBC   - 11 PI- P           8/67
W   C       CONTE1 SUPERSEDED BY CONTE2 BELOW
W   *       160.0    APPROX.          CONTE 2   67 HBC   - 11.0 PI- P        10/67
W            33.       19.            DANYSZ    67 HBC   +-  3,3.6 PBAR P     7/67
W   *       105.0                     HOOGLAND  67 HBC     C 3.0 K-P TO LAMB  9/67
W   K        76.       46.            KEY       67 HBC   - SEE NOTE K ABOVE 11/67
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1C A1 PARTIAL DECAY MODES

```
P1      A1 INTO RHO PI                                        L 9S 8
P2      A1 INTO KBAR K                                        S10S11
P3      A1 INTO ETA PI                                        S14S 8
P4      A1 INTO ETA PRIME PI                                  L 2S 8
P5      A1 INTO 3 PI                                          S 8S 8S 8
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1C A1 BRANCHING RATIOS

```
R1  *   A1 INTO (KBAR K)/(RHO PI)                            (P2)/(P1)
R1  *         0.01 CR LESS              DEUTSCH 1 66 HBC   +
R1            0.0025 CR LESS            DAHL      67 HBC   -  4.0 PI- P

R2  *   A1 INTO (ETA PI)/(RHO PI)                            (P3)/(P1)
R2  *         0.015 CR LESS             DEUTSCH 1 66 HBC   +

R3  *   A1 INTO (ETA PRIME PI)/(RHO PI)                      (P4)/(P1)
R3  *         0.015 CR LESS             DEUTSCH 1 66 HBC   +

R   *FOR 1+ NONET SU3 RATES SEE E.G. GOLDHABER, REVIEW BERKELEY CONF.1966
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REFERENCES FOR A1

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ADERHOLZ 64 PL 10 226          AACH+BERL+BIRM+BONN+DESY+HAMB+IMP.COL+ MPI
DEUTSCH 1 66 PL 20 62          DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
DEUTSCH 2 66 PL 22 112         DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
GOLDHABE 66 BERKELEY CONF.     G. GOLDHABER, MESON REVIEW //////////// LRL

CHUNG    67  UCRL-16881 REV     S.U.CHUNG,O.DAHL,J.KIRZ,C.A.MILLER /// LRL
CONTE 1  67  NC  51 A  175      +TOMASINI,CORDS+//GENOVA+HAM+MILAND+SACLAY
CONTE 2  67  HEIDELBERG CONF.   +TOMASINI+CORDS+ //// GENOVA+HAMB+MIL+SACL
DAHL     67  UCRL-16978         +HARDY+HESS+KIRZ+MILLER ///////////////// LRL
DANYSZ   67  NC 51 A 861        DANYSZ+FRENCH+SIMAK ////////////////// CERN
FRIEMAN  67  PREPRINT           +MAURER+MICHALON+OUDET+SCHIBY+/HEID+STRASB
HOOGLAND 67  HEIDELBERG CONF.   +KLUYVER,TENNER                  //  ZEEMAN LAB
KEY      67  PREPRINT           +PRENTICE+COOPER+MANNER+WALKER+/ITO+ANL+HIS
MORRISON 67  PRIV. COMM.        C.R.C.MORRISON ////////////////////// CERN
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PAPERS NOT REFERRED TO IN DATA CARDS

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BELLINI   63 NC 29 696          BELLINI,FIORINI,PERZ,NEGRI,RATTI /// MILAN
ALLARD    64 PL 12 143          ALLARD+ // PARIS+CERN+MILAN+CEA-SAC+UC-BKY
   ALLARD 64 DATA SUPERSEDED BY ALLARD 66
GOLDHABE 64 PRL 12 336          GOLDHABER,BROWN,KADYK,SHEN,TRILLING/LRL+UC
HESS      64 DUBNA CONF  1 422  HESS,CHUNG,DAHL,+HARDY,KIRZ,MILLER //// LRL
   HESS   64 DATA SUPERSEDED BY CHUNG 66
LANDER    64 PRL 13 346 A       LANDER,ABOLINS,CARMONY,HENDRICKS +/// UCSC  JP

ABOLINS   65 ATHENS(CP-IO)CONF. +CARMONY,LANDER,XLONG,YAGER ///// LA JOLLA I=1
ALITTI    65 PL 15 69           ALITTI,BATON,DELER,CRUSSARD+ ///// SAC+BOL

ALLARD    66 NC 46A 737         +CRIJARD+FENNESSY+ // ORSAY+MILAN+SAC+BERK
   ALLARD+ 66 GET GOOD FIT TO M(PI RHO) ONLY WHEN ASSUMING ADDITIONAL RESC-
   NANCES BETWEEN 940 AND 1315 MEV
HESS      66 UCRL-16832         R I HESS (THESIS, BERKELEY)          // LRL

SLATTERY 67 NC 50A 377          +KRAYBILL+FORMAN+FERBEL //////// YALE+RCCH   JP
```

B(1210)

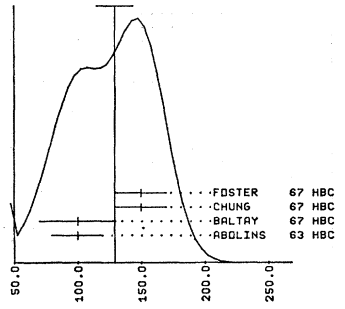
11 B MESON (1210,JPG=A +) I=1

11 B MESON MASS (MEV)

```
M         60 1220.0                    ABOLINS   63 HBC   +
M            1220.0                    GOLDHABER 65 HBC
M            1259.0     27.0           AEC COLL. 67 HBC   +   8.0 PI+ P       10/67
M        376 1200.      20.            BALTAY    67 HBC   +- 0.0 PBAR P        2/67
M   *        1270.                     BISWAS    67 HBC       8. PI- P        11/67
M            1220.      20.            CHUNG     67 HBC   -  3.2,4.2 PI- P     9/67
M            1220.0     20.0           FOSTER    67 HBC      P(BAR)P,REST      9/67
M                       . . . . . . . .
M   AVG      1220.3543  10.7663   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

M   *  IN THE 3-4 PI-P DATA,THE B ENHANCEMENT MAY BE DECK EFFECT (CHUNG 67)
```

WEIGHTED AVERAGE = 129.0 ± 14.2
SCALE = 1.32 CHISQ = 5.2 CONLEV = 0.155



11 B MESON WIDTH (MEV)

```
W         60  100.0      20.0          ABOLINS   63 HBC   +
W             80.0                     GOLDHABER 65 HBC
W   *        204.       75.           ABC COLL. 67 HBC   +   8. PI+ P        11/67
W        376 100.       30.           BALTAY    67 HBC   +- 0.0 PBAR P        2/67
W   *        250.                     BISWAS    67 HBC       8. PI- P        11/67
W            150.       20.           CHUNG     67 HBC   -  3.2,4.2 PI- P     9/67
W            150.0      20.0          FOSTER    67 HBC      P(BAR)P,REST      9/67
W                       . . . . . . . .
W   AVG      129.0323   14.2448   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                        (SEE IDEOGRAM)
```

11 B MESON PARTIAL DECAY MODES

```
P1      B MESON INTO OMEGA+PI                                 L 1S 8
P2      B MESON INTO 2PI+ 2PI-                                S 8S 8S 8S 8
P3      B MESON INTO K KBAR                                   S1CS10
P4      B MESON INTO PI PI                                    S 8S 8
P5      B MESON INTO PI PHI                                   S 9S 4
P6      B MESON INTO ETA PI (FORBIDDEN BY G)                  S14S 8
P7      B MESON INTO K KBAR PI                                S1CS10S 8
```

11 B MESON BRANCHING RATIOS

```
R1  *   B INTO 4PI/(OMEGA PI)                                (P2)/(P1)
R1            0.5   CR LESS             ABOLINS   63 HBC   +

R2  *   B MESON INTO (K KBAR)/(OMEGA PI)                     (P3)/(P1)
R2            0.02  CR LESS             DAHL      67 HBC   -  1.6-4.2 PI- P
R2            0.1C  CR LESS (CL 9C)     BALTAY    67 HBC   +-                 2/67

R3  *   B MESON INTO (PI PI)/(PI OMEGA)                       (P4)/(P1)
R3            0.3   CR LESS             ADERHOLZ  64 HBC

R4  *   B MESON INTO (PI PHI) / (PI OMEGA)                    (P5)/(P1)
R4            0.015 CR LESS             DAHL      67 HBC      1.6-4.2 PI- P

R5  *   B MESON INTO (ETA PI) / (PI OMEGA)                    (P6)/(P1)
R5            0.25  CR LESS (CL 9C)     BALTAY    67 HBC   +-                 2/67

R6  *   B MESON INTO (K KBAR PI) / (PI OMEGA)                 (P7)/(P1)

R6  *   B+- INTO ((K KBAR)+- PIO) / (PI OMEGA)
R6            0.0E  CR LESS (CL 9C)     BALTAY    67 HBC   +-                 2/67

R6  *   B+- INTO (KS KS PI+-) / (PI OMEGA)
R6            0.02  CR LESS (CL 9C)     BALTAY    67 HBC   +-                 2/67

R6  *   B+- INTO (KS KL PI+-) / (PI OMEGA)
R6            0.0E  CR LESS (CL 90)     BALTAY    67 HBC   +-                 2/67
```

REFERENCES FOR B MESON

```
ABOLINS  63 PRL 11 381          ABOLINS,LANDER,MEHLHOP,XLONG,YAGER // UCSC
ADERHOLZ 64 PL 10 240           AACHEN+BERLIN+BIRM+BONN+HAMBURG+IC-LONE+MPI
GOLDHABE 65 PRL 15 118          G GOLDHABER,S GOLDHABER,KADYK,SHEN /// LRL

ABC COLL 67  HEIDELBERG CONF. ////////////AACHEN+BERLIN+CERN COLLABORATION
BALTAY   67  PRL 18 93          +SEVERIENS+YEH+ZANELLO ////////// CCT+BNL
CHUNG    67  UCRL-16881 REV     S.U.CHUNG,O.DAHL,J.KIRZ,C.A.MILLER /// LRL
DAHL     67  UCRL-16978         +HARDY+HESS+KIRZ+MILLER ///////////////// LRL
FOSTER   67  HEIDELBERG CONF.   +GAVILLET,LABROSSE,MONTANET+// CERN+C.DE F
```

PAPERS NOT REFERRED TO IN DATA CARDS

```
BONDAR    63 PL 5 209           BONDAR,GOOD+//AACHEN+BIRM+BONN+IC-LONE+MPI
CARMONY   64 PRL 12 254         CARMONY,LANDER,RINDFLEISCH,XLONG,YAGER//UC   JP
SLATTERY 67 NC 50A 377          +KRAYBILL+FORMAN+FERBEL //////// YALE+RCCH
```

f(1260)

5 F (1260,JPG=2++) I=0

5 F MASS (MEV)

```
M            1250.0     25.0          SELOVE    62 HBC
M            1260.0     35.0          VEILLET   63 FBC
M          5 1250.0                   GLIAGOSS  63 HBC
M          5 1260.0                   BONDAR    63 HBC
M            1250.0                   LEE       64 HBC
M            1240.0     20.0          ACCENSI   66 HBC
M       1416 1267.0     10.0          JACOBS    66 HBC     2-3 PI-P,T CUT2G 10/67
M            1275.0     25.0          WAHLIG    66 SPRK                     11/66
M            1263.0      4.0          ARMENISE  67 DBC       5.1 PI+C         9/67
M   *        1255.      13.           BARLOW    67 HBC     (KO1 KO1 MODE)     11/66
M            1270.0     15.C          BIRD      67 SPRK    3.2 PI-P,PI+PI-N  10/67
M   *        1271.       9.           EISNER    67 HBC   4.2 PI-P (ALL T)     9/67
M            1264.       7.           EISNER    67 HBC   4.2 PI-P (T CUT 2C)  9/67
M            1249.0     90.0          FOSTER    67 HBC   +- PBAR P AT REST    9/67
M            1267.      15.           LAMSA     67 HBC       8 PI-P          10/67
M            1262.0      7.0          PCIRIER   67 HBC       8.0 PI- P       11/67
M   S        1276.      11.           RABIN     67 HBC       8.5 PI+ P        9/67
M   S        S-WAVE BREIT-WIGNER FIT
M                       . . . . . . . .
M   AVG      1263.1988   2.7859   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
```

5 F WIDTH (MEV)

```
W             100.0     25.0          SELOVE    62 HBC
W             200.0     CR LESS       VEILLET   63 FBC
W          85 160.0                   BONDAR    63 HBC
W             130.0     20.0          LEE       64 HBC
W             102.0     46.0          ACCENSI   66 HBC
W       1416   99.0     10.0          JACOBS    66 HBC     2-3 PI-P,T CUT2G 10/67
W             100.                    WAHLIG    66 SPRK                     11/66
W             202.0     13.0          ARMENISE  67 DBC       5.1 PI+C         9/67
W   *          82.      34.           BARLOW    67 HBC     (KO1 KO1 MODE)     11/66
W             160.0     20.C          BIRD      67 SPRK    3.2 PI-P,PI+PI-N  10/67
W   *         219.      39.           EISNER    67 HBC   4.2 PI-P (ALL T)     9/67
W             173.      25.           EISNER    67 HBC   4.2 PI-P (T CUT 2C)  9/67
W             173.0     50.0          FOSTER    67 HBC   +- PBAR P AT REST    9/67
W             113.      30.           LAMSA     67 HBC       8 PI-P          10/67
W             163.0     16.0          PCIRIER   67 HBC       8.0 PI- P       11/67
W   S         155.      17.           RABIN     67 HBC       8.5 PI+ P        9/67
W   S         S-WAVE BREIT-WIGNER FIT
W                       . . . . . . . .
W   AVG      140.8581  13.4869   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3)
                        (SEE IDEOGRAM)
```

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

5 F PARTIAL DECAY MODES

```
P1     F  INTO PI+ PI-                                        S 8S 8
P2     F  INTO 2PI+ 2PI-                                      S 8S 8S 8S 8
P3     F  INTO K KBAR                                         S12S12
```

5 F BRANCHING RATIOS

```
R1  *  F  INTO (4PI)/(2PI)                                   (P2)/(P1)
R1           0.08     0.06          BONDAR     63 HBC
R1           0.04  CR LESS          CHUNG      65 HBC

R2  *  F  INTO (K KBAR)/(PI PI)                              (P3)/(P1)
R2  *     DETERMINATION DIFFICULT BECAUSE PROXIMITY OF A2 WHICH HAS SAME
R2  *     NEUTRAL (K KBAR) MODES
R2           0.05  CR LESS          BARMIN     65
R2           0.16  CR LESS          WANGLER    65 HBC
R2           0.06  CR LESS          BRANCT     66 HBC     CONF.LIMIT 0.95
R2           0.05 CR LESS           DEUTSCHMA  66 HBC
R2  F        0.023    0.006         FISCHER    66 SPRK
R2  F        RESULT GOT CHANGED BY MORE THAN 1 S.D.(SEE BEUSCH 67)          5/67
R2  B        PROBABLY SEEN          BARLOW     67 HBC     1.2 PBAR P--K1K1 11/66
R2  N        0.047    0.012 + SYST. BEUSCH     67 SPRK    5,7,12 PI-P      9/67
R2  N        PEAK UNRESOLVED FROM A2
R2  *        0.025 CR LESS          DAHL       67 HBC      1.6-4.2 PI- P

R   *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SCCOLOW, PRL 15,329(65)
```

****** ********** ********** ********** ********** ********** ********** **********

REFERENCES FOR F

```
SELOVE   62 PRL 9 272          SELOVE,HAGOPIAN,BRODY,BAKER,LEBOY // PENNA
BONDAR   63 PL 5 153 .         BONDAR+//AACHEN+BIRM+BONN+CESY+IC-LONC+MPI
GUIRAGOS 63 PRL 11 85          Z.G.T. GUIRAGOSSIAN ////////////////// LRL
VEILLET  63 PRL 10 29          VEILLET,MENNESSY,BINGHAM,ELCOH+//PAR+MILAN
LEE      64 PRL 12 342         LEE,RCE,SINCLAIR,VANDERVELDE //// MICHIGAN

BARMIN   65 SJNP 1 870         +DOLGOLENKO+EROFEEV+KRESTNIKOV+/ ITEP MOSC
CHUNG    65 PRL 15 325         CHUNG,DAHL,HARDY,HESS,JACOBS,KIRZ //// LRL
GUIRAGOS 65 PRL 11 85          Z G T GUIRAGOSSIAN ////////////////// LRL
WANGLER  65 PR  137 B 414      T P WANGLER,A R ERWIN,W WALKER //WISCONSIN

ACCENSI  66 PL 20 557          ACCENSI,ALLES-BORELLI,FRENCH,FRISK+ //CERN
BEUSCH   66  PREPRINT          BEUSCH,FISCHER,ASTBURY,MICHELINI+/ETH+CERN
BRANCT   66  BERKELEY CONF.    BRANCT,COCCONI,CZYZEWSKI+ //CERN+CRAC+WARS
DEUTSCHM 66 PL 20 82           DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
FISCHER  66  PRIVATE COMM.     W E FISCHER(BASED ON BEUSCH 66)/ ETH +CERN
JACOBS   66  UCRL-16877        L.D.JACOBS ////////////////////////////// LRL
WAHLIG   66 PR  147  941       +SHIBATA,GORDON,FRISCH,PANNELLI //MIT+PISA  J

ARMENISE 67  HEIDELBERG CONF.  +GHIGINI,FORINO+//BARI+BOLOGN+FIRENZ+CRSAY
BARLOW   67 NC 50A 701         +LILLESTOL+MONTANET+/CERN+CCF+IR+LIVERPOOL
BEUSCH   67 PL 25 B 357        +FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
BIRD     67  HEIDELBERG CONF.  +WHITEHEAD,AULD++/AERE+RHEL+STHAMPT+LC.LON
DAHL     67  UCRL-16978        +HARDY+HESS+KIRZ+WILLER /////////////// LRL
EISNER   67  PR TO BE PUBL.    +JOHNSON+KLEIN+PETERS+SAHLI+YEN+ // PURDUE
FOSTER   67  HEIDELBERG CONF.  +GAVILLET,LABROSSE,MONTANET+  //  CERN+COF
LAMSA    67  PREPRINT         +CASON+BISWAS+DERADO+GROVES+ /// NOTRE DAME
POIRIER  67  PREPRINT          +BISWAS,CASON,DERADO,KENNEY+//NCTRDAM+PENN
RABIN    67  THESIS           M. RABIN ////////////////////////// RUTGERS
```

PAPERS NOT REFERRED TO IN DATA CARDS

```
HAGOPIAN 63 PRL 10 533         V HAGOPIAN,W SELOVE ////////////////// PENNA
ADERHOLZ 64 PL 10 240          AACHEN+BERLIN+BIRM+BONN++AMBLR+IC-LONC+MPI  EJ
BRUYANT  64 PL 10 232          BRUYANT,GOLDBERG,HOLDER,FLEURY,HUC/CERN+PA  I
SODICKSO 64 PRL 12 485         SODICKSON,WAHLIG,PANNELLI,FRISCH+ //// MIT  I
BARMIN   65 SJNP 1 230         +DOLGOLENKO,ELENSKY,EROFEEV+ / ITEP MOSCOW  JP
STRUGALS 67  JINR E1-3100      STRUGALSKI+CHUVILO+IVANOVSKAJA+ //// DUBNA
```

****** ********** ********** ********** ********** ********** ********** **********

D(1285)

8 D MESON (1285,JPG= +) I=0

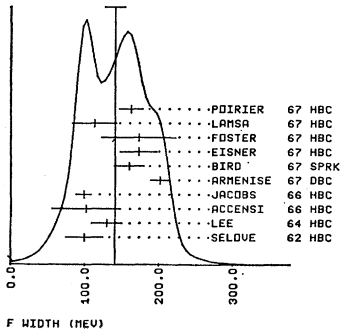
DAHL 67 FAVOR JP=1+, BUT CC NOT EXCLUDE 2-,0-.

8 D MESON MASS (MEV)

```
M          1290.0      8.0          D.ANDLAU   65 HBC   1.2 PBAR P, 5-6 PFS
M          1290.    APPROX.        BARLOW     67 HBC    1.2 PBAR P, 4PFS  5/67
M          1283.0      5.0          DAHL       67 HBC    1.6-4.2 PI- P
M          . . . . . . . . .
M   AVG    1284.9663   4.2400   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
```

8 D MESON WIDTH (MEV)

```
W          25.0     15.0          D.ANDLAU   65 HBC     1.2 PBAR P
W          35.0     10.0          DAHL       67 HBC     1.6-4.2 PI- P
W          . . . . . . . . .
W   AVG    31.9231   8.3205   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
```



8 D MESON PARTIAL DECAY MODES

```
P1         C MESON INTO K KBAR PI                              S11S11S 9
P2         C MESON INTO PI PI RHO                              S 9S 9U 9
```

8 C MESON BRANCHING RATIOS

```
R1  *      C MESON INTO (PI PI RHO) / (K KBAR PI)          NUM 2
R1  *                                                      DEN 1
R1  *        2.0   CR LESS          DAHL       67 HBC    C CHARGED PI ONLY

R   *FOR 1+ NONET SU3 RATES SEE E.G. GOLDHABER, REVIEW BERKELEY CONF.1966
```

****** ********** ********** ********** ********** ********** ********** **********

REFERENCES FOR C MESON

```
D.ANDLAU 65 PL 17 347          D.ANDLAU,ASTIER,BARLOW +///CCF+CERN+RAL+LIV
ROSENFEL 65 OXFORD CONF 58     A H ROSENFELD ////////////////// LRL--RVUE
BARLOW   67 NC  50 A  701      +MONTANET,D-ANDLAU+/CERN+CCF+IOR+LIVERPOOL
DAHL     67  UCRL-16578        +HARDY+HESS+KIRZ+WILLER ////////////// LRL I JP
   SEE ALSO 65 PRL 14 1074     MILLER,CHUNG,DAHL,HESS,HARCY,KIRZ+//LRL+UC
```

****** ********** ********** ********** ********** ********** ********** **********
****** ********** ********** ********** ********** ********** ********** **********

A2(1300)

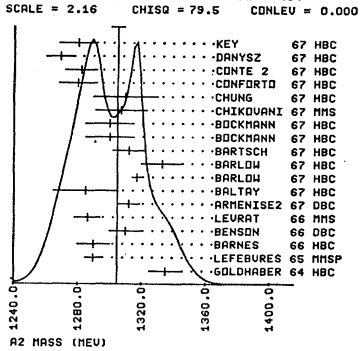
12 A2 MESON (1300,JPG=2+-) I=1

LEVRAT 66, CHIKOVANI 67 AND MORRISON 67 SUGGEST TWO DIFFERENT MESONS NEAR 1300 MEV.

12 A2 MESON MASS (MEV)

```
M          1320.0                    ADERHOLZ   64 HBC
M          1335.0     10.0           GOLDHABER  64 HBC   +-  3.7 PI+- P
M          1270.0                    DERADO     65 HBC
M      130 1310.0                    FORINO     65 DBC   + C 4.5 PI+ D
M     1425 1290.0      5.0           LEFEBVRES  65 MMSP  -
M          1300.0                    SEIDLITZ   65 DBC   -
M          1290.0     10.0           BARNES     66 HBC   -
M          1310.0     10.0           BENSON     66 DBC
M   *      1280.0                    DEUTSCHMA  66 HBC   +   8.0 PI+ P
M   * 1800 1310.0     10.0    COMP.BY FERBEL    66       +-  PI+- P
M     1060 1286.      8.             LEVRAT     66 MMS   -   6-7 PI- P          2/67
M   C      1320.     10.             ARMENISE1  67 DBC    C 5.1 PI+ D          8/67
M   C      SUPERSEDED BY ARMENISE2 BELOW
M          1312.0     7.0            ARMENISE2  67 DBC    C 5.1 PI+D           9/67
M      137 1285.     20.             BALTAY     67 HBC    C 8.5 PI+ P          7/67
M       80 1317.0     3.0            BARLOW     67 HBC   +-  1.2 PBAR P, KK    9/67
M       60 1333.0    13.0            BARLOW     67 HBC   +-  1.2 PBAR P, KK    9/67
M          1312.     10.             BARTSCH    67 HBC    C 8 PI+ P            8/67
M   N      1344.0     7.       6.    BEUSCH     67 SPRK   C 5-12 PI- P         7/67
M   N      K01 K01 MODE. PEAK UNRESOLVED FROM F.
M      240 1300.0     15.0            BOCKMANN   67 HBC    C 5.0 PI+P           9/67
M      140 1300.0     15.0            BOCKMANN   67 HBC   +   5.0 PI+P          9/67
M   K      1330.0     20.0            BOCKMANN   67 HBC    5.0 PI+P   TC KK     9/67
M   A      1288.      14.             CASON      67 HBC    8 PI- P              5/67
M   A      ANALYSIS COMPLICATED BY NEARBY PEAK (A1.S) AT 1190 MEV
M     4000 1307.      16.             CHIKOVANI  67 MMS    7 PI- P              8/67
M          1310.      20.             CHUNG      67 HBC    2.7-4.5 PI- P        8/67
M      130 1280.0     12.0            CONFORTO   67 HBC   +-  0. PBAR P IN KK   9/67
M   C      130.    APPROX.            CONTE 1    67 HBC    11 PI- P             8/67
M   C      SUPERSEDED BY CONTE2 BELOW
M          1282.0     10.0            CONTE 2    67 HBC    11.0 PI- P          10/67
M   K      1317.2      4.0            DAHL       67 HBC    2.7-4.5 PI- P        8/67
M   K      1315.7     10.8            DAHL       67 HBC    2.7-4.5 PI- P        8/67
M          1269.       9.             DANYSZ     67 HBC   +-  3,3.6 PBAR P      7/67
M   *      1300.    PRELIM.           FRIEDMAN   67 HBC   +-  5.7 PBAR P        7/67
M          1309.0                     MOORLAND   67 HBC    3.0 K-P TO LAMB      9/67
M          1280.      12.             KEY        67 HBC    3 PI-P              11/67
M
M   K      VALUE FROM K K(BAR) MODE ONLY                                        9/67
M
M   *                 EVIDENCE FOR TWO-PEAK STRUCTURE
M
M   *                 LEVRAT+ 66 HAVE SLIGHT EVIDENCE FOR TWO-PEAK STRUCTURE.
M   *                 WITH BASICALLY THE SAME SET-UP; CHIKOVANI+ 67 CONFIRM
M   *                 THIS. COMBINING THEIR DATA WITH THE CLC DATA OF LEVRAT+
M   *                 66, CHIKOVANI + 67 GET THE FOLLOWING RESULTS.
M
M   *          1274.      16.      FOR FIRST  PEAK   (TWO INDEP. PEAKS ASSUMED)  8/67
M   *          1320.      16.      FOR SECOND PEAK   (TWO INDEP. PEAKS ASSUMED)  8/67
M
M   *          1296.      16.      FOR FIT TO DIPOLE                             8/67
M
M   AVG    1304.7185   4.0364   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.2)
```

(SEE IDEOGRAM)



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

12 A2 MESON WIDTH (MEV)

W		100.0			ADERHOLZ	64	HBC			
W		90.0	10.0		GOLDHABER	64	HBC	+-	3.7 PI+- P	
W		150.0			DERADO	65	HBC			
W	1425	99.0	15.0		LEFEBVRES	65	MMSP	-		
W		140.0			SEIDLITZ	65	DBC	-		
W		70.0	10.0		BARNES	66	HBC	-		
W	N	110.0	45.0		BENSON	66	DBC			
W	N	SUPERSEDED BY BENSON 1 66								
W		100.	15.		BENSON 1	66	DBC		C 3.65 PI+D	1/67
W	* 1800	80.0	10.0	COMP.BY	FERBEL	66		+-	PI+- P	
W	1060	98.	5.		LEVRAT	66	MMS	-	6,7 PI- P	2/67
W	C	120.	20.		ARMENISE1	67	DBC		C 5.1 PI+ D	8/67
W	C	SUPERSEDED BY ARMENISE2 BELOW								
W		90.0	8.0		ARMENISE2	67	DBC		O 5.1 PI+D	9/67
W	137	100.	25.		BALTAY	67	HBC		O 8.5 PI+ P	7/67
W	60	56.0	28.0		BARLOW	67	HBC	+-	1.2 PBAR P, KK	9/67
W	80	56.0	15.0		BARLOW	67	HBC	+-	1.2 PBAR P, KK	9/67
W		61.	25.		BARTSCH	67	HBC		C 8 PI+ P	8/67
W	N	88.	23.	22.	BEUSCH	67	SPRK		O 5-12 PI- P	7/67
W	N	KOI KOI MODE. PEAK UNRESOLVED FROM F.								
W	240	100.0	11.0		BOCKMANN	67	HBC		C 5.0 PI+P	9/67
W	140	100.0	20.0		BOCKMANN	67	HBC	+	5.0 PI+P	9/67
W	K	100.0	20.0		BOCKMANN	67	HBC		5.0 PI+P TC KK	9/67
W	A	84.	30.	20.	CASON	67	HBC	-	8 PI- P	5/67
W	A	ANALYSIS COMPLICATED BY NEARBY PEAK (A1.5) AT 1190 MEV								
W	4000	90.	15.		CHIKOVANI	67	MMS	-	7 PI- P	8/67
W		80.	20.		CHUNG	67	HBC	-	2.7-4.5 PI- P	8/67
W	130	90.0			CONFORTO	67	HBC	+-	O. PBAR P IN KK	9/67
W	D	80.	APPROX.		CONTE 1	67	HBC	-	11 PI- P	8/67
W	D	SUPERSEDED BY CONTE 2 BELOW								
W	*	120.0	APPROX.		CONTE 2	67	HBC	-	11.0 PI- P	10/67
W	K	47.	18.		DAHL	67	HBC	-	2.7-4.5 PI- P	8/67
W	K	80.5	36.5		DAHL	67	HBC		C 2.7-4.5 PI- P	8/67
W		45.	22.		DANYSZ	67	HBC	+-	3,3.6 PBAR P	7/67
W	*	69.0			MCGLAND	67	HBC		C 3.0 K-P TO LAMB	9/67
W		91.	18.		KEY	67	HBC	-	3 PI-P	11/67
W										
W	K	VALUE FROM K K(BAR) MODE ONLY								9/67
W										
W	*	RESULTS FOR TWO-PEAK STRUCTURE BY CHIKOVANI+ 67								
W	*	(CF. NOTE UNDER MASS LISTINGS ABOVE)								
W										
W	*	29.	10.		FOR FIRST PEAK	(TWO INDEP. PEAKS ASSUMED)				8/67
W	*	35.	10.		FOR SECOND PEAK	(TWO INDEP. PEAKS ASSUMED)				8/67
W										
W	*	30.	3.		FOR FIT TO DIPOLE					8/67
W		. . . . .								
W	AVG	89.7620	3.4687		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)					
		(SEE IDEOGRAM)								

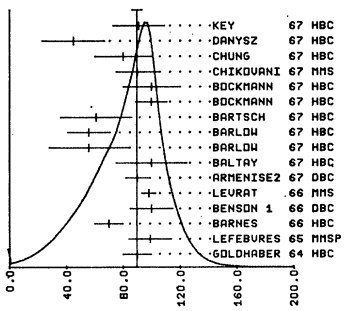
12 A2 MESON PARTIAL DECAY MODES

P1	A2 MESON INTO RHO PI	L 9S 8
P2	A2 MESON INTO KBAR K	S1CS12
P3	A2 MESON INTO ETA PI	S14S 8
P4	A2 MESON INTO ETA PRIME PI	L 2S 8
P5	A2 MESON INTO PI+ PI- PIO	S 8S 8S 9

12 A2 MESON BRANCHING RATIOS

R1	*	A2 MESON INTO (K KBAR) / (RHO PI)							(P2)/(P1)	
R1	*	0.06	CR LESS		LANDER	64	HBC	+		
R1	A	0.02	CR LESS		ARMENTERO	65	HBC	-		
R1	A	SUPERSEDED BY GAVILLET 67 BELOW								
R1	P	0.03	0.02		DEUTSCHMA	66	HBC	+		
R1	M	FOR NEW VALUE, SEE MORRISON 67 BELOW								
R1	N	0.13	0.03		BEUSCH	67	SPRK		O 5,7,12 PI-+	9/67
R1	N	KOI KOI MODE. UNRESOLVED FROM F.								
R1	*	0.15	0.05		BOCKMANN	67	HBC		C 5.0 PI+P	9/67
R1	*	0.05	0.05		BOCKMANN	67	HBC	+	5.0 PI+P	9/67
R1		0.054	0.022		CHUNG	67	HBC	-		1/67
R1	130	0.042	0.016		GAVILLET	67	HBC	+-	O. PBAR P	9/67
R1	*	0.04	0.02		MORRISON	67	HBC		(SEE DEUTSCHM 66)	8/67
R1		. . . . .								
R1	AVG	.0462	.0129		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					
R1	FIT	.047	.013		VALUE FROM CONSTRAINED FIT					
R2	*	A2 MESON INTO (ETA PI)/TOTAL							(P3)/(P1)	
R2	X	0.03 OR LESS			DEUTSCHMA	66	HBC	+		
R2	X	REPLACED BY MORRISON 2 67 BELOW								
R2		0.084	0.023		MORRISON2	67	HBC	+	8 PI+ P	11/67
R2		. . . . .								
R2	FIT	.109	.021		VALUE FROM CONSTRAINED FIT					
R3	*	A2 MESON INTO (ETA PI) / (RHO PI)							(P3)/(P1)	
R3		0.3	0.2		ADERHOLZ	65	HBC			
R3		0.24	0.08		DUBOVIKCV	66	HBC	-		11/66
R3	* 15	0.24	0.08		BOCKMANN	67	HBC	+	5.0 PI+P	9/67
R3		0.12	0.08		CHUNG	67	HBC	-		12/66
R3		0.22	0.09		CONTE 1	67	HBC	-		8/67
R3		0.16	0.10		KEY	67	HBC	-	3 PI-P	11/67
R3		. . . . .								
R3	AVG	.1506	.0422		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)					
R3	FIT	.128	.028		VALUE FROM CONSTRAINED FIT					

WEIGHTED AVERAGE = 89.76 ± 3.47
SCALE = 1.18 CHISQ = 21.0 CONLEV = 0.137



A2 WIDTH (MEV)

R4 * A2 MESON INTO (ETA PRIME PI) / TOTAL (P4)/TOTAL
R4 0.1 CR LESS CHUNG 65 HBC -
R4 * 0.015 CR LESS DEUTSCHMA 66 HBC +

R6 * A2 MESON INTO (PI+ PI- PIO) / (RHO PI) (P5)/(P1)
R6 0.17 CR LESS BENSON 66 DBC C

R *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SCCOLOW, PRL 15,329(65)

12 QUANTUM NUMBER DETERMINATIONS

Q1	*	IJP FOR NEUTRAL A2					
Q1	*	I = 1		ABOLINS	65		
Q1	*	I = 1	JP = 2+	BENSON	66 HBC	3.65 PI+ D	11/67
Q1	*	I = 1	JP = 2+	ARMENISE2	67 DBC	C 5.1 PI+D	9/67
Q1	*	I = 1	JP = 2+	BALTAY	67		
Q1	*	I = 1	JP = 2+	BARTSCH	67		
Q1	*		JP = 2+	MARTIN	67 SPRK	7.0 PI-P MM	9/67

REFERENCES FOR A2

ADERHOLZ	64	PL 10 248	AACHEN+BERLIN+BIRM+BONN+HAPB+IC-LONDON+MPI
GOLDHABE	64	DUBNA CONF 1 480	G GOLDHABER,S GOLDHABER,CHALLORAN,SHEN/LRL
LANDER	64	PRL 13 346	+ABOLINS,CARMONY,HENDRICKS,YLCNG+/ LA JOLLA
ABOLINS	65	ATHENS(CHIO)CONF.	+CARMONY,LANDER,XUONG,YAGER ///// LA JOLLA I=1
ARMENTER	65	PL 17 344	ARMENTEROS,EDWARDS,JACOBSEN + //CERN+COEF
CHUNG	65	PRL 15 325	+CAHL,HARCY,HESS,JACOBS,KIRZ,MILLER // LRL
DERADO	65	PRL 14 872	DERADO,KENNEY,PCIRIER,SHEPHARD//NOTRE DAME
FORINO	65	PL 19 68	+GESSAROLI+LENDINARA+/BOL+BARI+FIR+CRS+SAC
LEFEBVRE	65	PL 19 434	CERN MISSING MASS SPECTROMETER GROUP /CERN
SEIDLITZ	65	PRL 15 217	L SEIDLITZ,D I DAHL,D H MILLER /////// LRL
BARNES	66	PRL 16 41	BARNES,FOWLER,LAI,ORENSTEIN + /// BNL+CCNY
BENSCN	66	PRL 16 1177	G BENSON,LOVELL,MARQUIT,RCES + // MICHIGAN
BENSON 1	66	MICH COO-1112-4	G.C.BENSON ////////////////////// MICHIGAN
DEUTSCHM	66	PL 20 82	DEUTSCHMANN,STEINBERG + //AACH+BERLIN+CERN
DUBOVIKC	66	PL 23 716+PRIV.C.	DUBOVIKCV,GRIGORIEV,VLADIMIRSKY + // ITEP
EHRLICH	66	PR 152 1194	R. EHRLICH,W.SELOVE,H.YUTA // PENNSYLVANIA
FERBEL	66	PL 21 111	FERBEL // ROCHESTER
LEVRAT	66	PL 22 714	CERN MISSING MASS SPECTROMETER GROUP /CERN
ARMENI 1	67	PL 25B 53	ARMENISE,FORINO,+ ///// BARI+BOL+FIR+CRSAY
ARMENI 2	67	HEIDELBERG CONF.	ARMENISE,FORINO,+ ///// BARI+BOL+FIR+CRSAY
BALTAY	67	PL 25B 160	+KIRSCH+KUNG+YEH+RABIN / CCLL+BNL+RUTGERS
BARLOW	67	NC 50A 701	+LILLESTOL+MONTANET+/CERN+CCF+IR+LIVERPCOL
BARTSCH	67	PL 25E 48	+DEUTSCHMANN+GROTE+COCCONI+/AACH+BERL+CERN
BEUSCH	67	PL 25 B 357	+FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
BOCKMANN	67	HEIDELBERG CONF.	+KOBE,ROST,POLS+//BONN+DLAB+NIJM+EPP+TURIN
CASON	67	PRL 18 88C	+LAMSA,BISWAS,DERADO,GROVES,+ // NOTREDAME
CHIKOVAN	67	PL 25B 44	CERN MISSING MASS SPECTROMETER GROUP//CERN
CHUNG	67	PRL 18 100	+CAHL,HARCY,HESS,KIRZ,MILLER /////// LRL
	ALSO	UCRL-16832	RICHARD L HESS--THESIS,BERKELEY // LRL
CHUNG	67	UCRL-16881 REV	S.U.CHUNG,O.DAHL,J.KIRZ,C.A.MILLER /// LRL
COHN	67	NP B1 57	+MCCULLOCH+BUGG+CONDO //// CRNL+UNIV.+TENN.
CONFORTO	67	PREPRINT TO NP	+MARECHAL,MONTANET+//CERN+CF+IPN+LIVERPCOL
CONTE 1	67	NC 51 A 175	+TOMASINI,CORDS+//GENOVA+HAP+MILANO+SACLAY
CONTE 2	67	HEIDELBERG CONF.	+TOMASINI,CORDS+//GENOVA+HAP+MILANO+SACLAY
DAHL	67	UCRL-16978	+HARDY+HESS+KIRZ+MILLER /////////// LRL
DANYSZ	67	NC 51 A 801	DANYSZ+FRENCH+SIPAK /////////////// CERN
FRICMAN	67	PREPRINT	+MAURER+MICHALON+GUDET+SCHIBY+/HEID+STRASB
GAVILLET	67	HEIDELBERG CONF	+VILLEMCES,FOSTER,MONTANET,BLOCH+/CERN+CDF
HOOGLAND	67	HEIDELBERG CONF.	+KLUYVER,TENNER // ZEEMAN LAB
KEY	67	PREPRINT	+PRENTICE+COOPER+MANNER+WALKER+/TO+ANL+WIS
MARTIN	67	HEIDELBERG CONF.	CERN MISSING MASS SPECTROMETER GROUP//CERN
MORRISON	67	PL 25 B 238	D.R.O.MORRISON ////////////////////////CERN
MORRISO2	67	PRIV.COMM.	D.R.O.MORRISON ////////////////////////CERN

PAPERS NOT REFERRED TO IN DATA CARDS

LANDER	64	PRL 13 346 A	LANDER,ABOLINS,CARMONY,HENDRICKS +/// UCSC	JP
ADERHOLZ	65	PR 136 B 697	AACHEN+BERLIN+BIRM+BONN+HAPB+LOND+MUENCHEN	
ALITTI	65	PL 15 69	ALITTI,BATON,DELER,CRUSSARC+/ SACLAY+BGLOG	JP
GOLDHABE	66	BERKELEY CONF.	G. GOLDHABER, MESON REVIEW ////////////LRL	
LAMSA	67	PREPRINT	+CASON+BISWAS+DERADO+GROVES+ /// NOTREDAME	
SLATTERY	67	NC 50A 377	+KRAYBILL+FORMAN+FERBEL //////// YALE+ROCH	JP

A2(1320)

A2,2 (1320) I=2 OR GREATER

SEEN AS A BUMP IN RHO- PI- MASS SPECTRUM.
EVIDENCE NOT COMPELLING. OMITTED FROM TABLE.

5G MASS (MEV)

M	34	1320.	25.		VANDERHAG 67	DBC	-- 5 PI-D	5/67

9G WIDTH (MEV)

W	34	150.	APPROX.		VANDERHAG 67	DBC	-- 5 PI-D	5/67

5C CROSS SECTION (MICROBARNS)

CS	34	15.	5.		VANDERHAG 67	DBC	-- 5 PI-D	5/67

REFERENCES FOR A2,2

VANDERHA	67	PL 24E 493	VANDERHAGEN+HUC+FLEURY+ /EP+IPN+BARI+ECLOG

E(1420)

6 E MESON (1420,JPG=A +) I=C

BAILLON 67 FAVOR JP=0-, DAHL 67 FAVOR 1+ BUT CC NOT EXCLUDE 2-, 0-.

6 E MESON MASS (MEV)

M		1425.	7.		BAILLON	67 HBC	0. PBAR P	11/66
M		1420.0	2C.C		DAHL	67 HBC	1.6-4.2 PI- P	
M		1423.	10.		FRENCH	67 HBC	3-4 PBAR P	6/67
M		. . . . .						
M	AVG	1424.0124	5.5125		AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)			

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

6 E MESCN WIDTH (MEV)

```
W          80.       10.          BAILLON   67 HBC     0. PBAR P       11/66
W          60.0      20.0         DAHL      67 HBC     1.6-4.2 PI- P
W          45.       20.          FRENCH    67 HBC     3-4 PBAR P      6/67
W          * . * . * . * . *
W   AVG    70.8333   9.6645   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)
                 (SEE IDEOGRAM)
```

6 E MESCN PARTIAL DECAY MCDES

```
P1          E INTO K K*(890)                                  S1CU18
P2          E INTO K KBAR PI                                  S12S12S 8
P3          E MESCN INTO PI PI RHO                            S 9S 9U 9
P4          E INTO PI(1003) PI                                L16S 8
P5          E INTO ETA PI PI                                  S14S 8S 8
```

6 E MESCN BRANCHING RATICS

```
R1  *       E INTO K K*(890)/((K K*)+(PI(1CC3) PI))       NLM 1
R1  *                                                     DEN 1  4
R1             .5C      .10          BAILLON   67 HBC                    11/66

R2  *       E MESON INTO (PI PI RHO) / (K KBAR PI)        NLM  3
R2  *                                                     DEN  2
R2  *          2.0   CR LESS         DAHL      67 HBC     C CHARGED PI CNLY

R3  *       E INTO(ETA PI PI)/(K KBAR PI)                 NLM     5
R3  *                                                     DEN  2
R3             7.0   CR LESS         FOSTER    67 HBC     0. PBAR P       1C/67
```

R *FOR 1+ NONET SU3 RATES SEE E.G. GOLDHABER, REVIEW BERKELEY CCNF.1966

REFERENCES FCR E MESCN

```
ARMENTER 64 DUBNA CCNF 1 467  ARMENTEROS,EDWARDS,JACOBSEN,ASTIER+ //CERN
BAILLON  67 NC 50A  393       +EDWARDS+C.ANDLAL+ASTIER+ //// CERN+CCF+IR
BARASH   67 PR 156  1399      BARASH,KIRSCH,MILLER,TAN //////////COLUMBIA
DAHL     67  UCRL-16978       +HARDY+HESS+KIRZ+MILLER ////////////// LRL I JP
   SEE ALSC 65 PRL 14 1C74    MILLER,CHUNG,DAHL,HESS,HARDY,KIRZ+ /LRL+UC
FOSTER   67  HEIDELBERG CCNF. +GAVILLET,LABROSSE, MONTANET+  // CERN+CDF
FRENCH   67  CERN/TC/PH.66-31 +KINSCN+MCDONALD+RIDIFORD+ //// CERN+BIRM
```

$K_S K_S$ (1440)

6 KSKS(144C) AND RHCRHO(141C) (JPC=V +) I GTE 0

EVIDENCE NOT YET COMPELLING, OMITTED FROM TABLE

ρρ(1410)

IF RHOO RHOC AND KS KS ARE MODES OF THE SAME RESONANCE THEN I=C.

29 KSKS AND RHCRHO MASS (MEV)

```
M   -------RHOO RHOC MODE--------
M          1410.0                    BETTINI   66 DBC   C  0. PBARP TO 5FR

M   -------KS KS MODE ----------
M   B*     POSSIBLY SEEN             ABRAMS    67 HBC     4.25 K- P       5/67
M   B      THE AUTHCRS ASSOCIATE THE PEAK WITH THE F PRIME, BUT BACKGROUND
M   B      ESTIMATION IS DIFFICULT
M          1412.     23.             BARLOW    67 HBC     1.2 PBAR P      5/67
M          1439.0     5.0     6.0   BEUSCH    67 SPRK    5,7,12 PI-P     9/67
M          * . * . * . * .
M   AVG    1437.5396  5.3492   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
```

29 KSKS AND RHCRHO WIDTH (MEV)

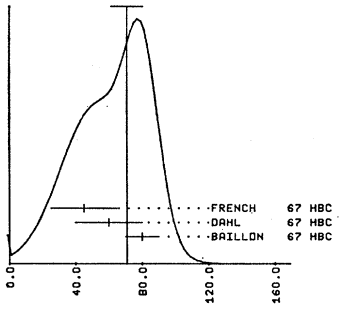
```
W   -------RHOO RHOC MODE-------
W          90.0                      BETTINI   66 DBC   C C. PBAR P TC 5FR

W   -------KS KS MODE ----------
W          100.      70.             BARLOW    67 HBC     1.2 PBAR P      5/67
W          43.0      17.0     18.0   BEUSCH    67 SPRK    5,7,12 PI-P     9/67
W          * . * . * . * .
W   AVG    46.3529   16.9775  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
```

REFERENCES FCR KSKS(1440) AND RHO RHC(141C)

```
BETTINI  66 NC 42A 695        +CRESTI,LIMENTANI,LORIA,PERLZZO+//PAC+PISA
ABRAMS   67 PRL 18 620        +KEMCE,GLASSER,SECHI-ZORN,KCLSKY /MARYLAND
BARLCW   67 NC  5C A  7C1     +MONTANET,D-ANDLAU+/CERN+CCF+IDR+LIVERPOOL
BEUSCH   67 PL 25 B 357       +FISCHER,GOBBI,ASTBURY,MICHELINI+/ETH+CERN
```

WEIGHTED AVERAGE = 70.83 ± 9.66
SCALE = 1.18 CHISQ = 2.8 CONLEV = 0.246



E WIDTH (MEV)

f'(1515)

13 F PRIME (1515,JPG=2++) I=0

13 F PRIME(1515) MASS (MEV)

```
M       14 1480.0                    CRENNELL  66 HBC     6.0 PI- P
M   B    5 1460.      10.             ABRAMS    67 HBC     4.25 K- P       5/67
M   B   BACKGROUND ESTIMATION DIFFICULT.                                   5/67
M          1515.0     7.0            AMMAR     67 HBC     5.5 K-P         9/67
M       70 1513.0     7.0            BARNES    67 HBC     4.6, 5. K- P    10/67
M          * . * . * . * . *
M   AVG    1514.0COC  4.9497   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
```

13 F PRIME(1515) WIDTH (MEV)

```
W   B    5  53.      18.             ABRAMS    67 HBC     4.25 K- P       5/67
W   B   BACKGROUND ESTIMATION DIFFICULT.                                   5/67
W          35.0      25.0           AMMAR     67 HBC     5.5 K-P         9/67
W       70  87.0     15.0           BARNES    67 HBC     4.6, 5. K- P    10/67
W          * . * . * . * . *
W   AVG    73.2353   22.9412  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.6)
```

13 F PRIME PARTIAL DECAY MCDES

```
P1          F PRIME INTO PI+ PI-                              SC8SC8
P2          F PRIME INTO K KBAR                               S12S12
P3          F PRIME INTO K K*(89C)                            S1CU18
P4          F PRIME INTO ETA ETA                              S14S14
P5          F PRIME INTO PI PI ETA                            S 8S 8S14
P6          F PRIME INTO PI K KBAR                            S 8S12S12
```

13 F PRIME BRANCHING RATICS

```
R1  *       F PRIME INTO (PI+ PI-)/(K KBAR)                   (P1)/(P2)
R1             0.2   CR LESS          AMMAR     67 HBC     5.5 K-P ,CL=.67  9/67
R1             0.18  CR LESS          BARNES    67 HBC     4.6, 5.C K- P    10/67
R1  N          .03   ESTIMATE FRCM SU3 GLASHOW   65  SU3

R2  *       F PRIME INTO (K KBAR) / TOTAL                     (P2)/TCTAL
R2  X          0.64      C.31        GCLCBERG  66, WITHDRAWN
R2  X       BARNES 66 POINT OUT THAT F PRIME UNRESOLVABLE FROM E MESCN

R3  *       F PRIME INTO (ETA ETA)/(K KBAR)                   (P4)/(P2)
R3             0.5C  CR LESS          BARNES    67 HBC     4.6, 5.C K- P    1C/67

R4  *       F PRIME INTO (PI PI ETA)/(K KBAR)                 (P5)/(P2)
R4             0.3   CR LESS          AMMAR     67 HBC     CL=0.67          10/67
R4             0.25      0.13         BARNES    67 HBC     4.6, 5.C K- P    1C/67

R5  *       F PRIME INTO (PI K KBAR + K K*(890))/(K KBAR) (P3+P6)/(P2)
R5             0.4   CR LESS          AMMAR     67 HBC     CL=0.67          10/67
R5             0.14  CR LESS          BARNES    67 HBC     4.6, 5.C K- P    1C/67
R5  B   OR AS 0.14      0.14         BARNES    67 HBC     4.6, 5.C K- P    1C/67
```

R *FCR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SCCOLOW, PRL 15,329(65)

REFERENCES FCR F PRIME

```
GLASHOW  65 PRL 15 329        S L GLASHCW, R F SCCOLOW     //SL3 BERKELEY
BARNES   65 PRL 15 322        REPLACED BY REFERENCE BELCW
BARNES   66  BERKELEY CCNF.   +CORNAN,GUIDONI,KALBFLEISCH,LONDON/BNL,SYR I=C
CRENNELL 66 PRL  16  1025     + KALBFLEISCH,LAI,SCARR,SCHLMANN +  // BNL I
GOLDBERG 66  SUBMITTED TO NC  + LEITNER,MUSTO,C RAIFEARTAIGH  //SYRACUSE
    ALSC 66  BERKELEY CONF    +KALBFLEISCH,LAI,SCARR,SCHLMANN+////// BNL I=C
    ALSC 67  HEIDELBERG CONF. LEITNER+                          // BNL+SYRACUSE
ABRAMS   67 PRL 18 620        +KEMDE,GLASSER,SECHI-ZORN,KCLSKY /MARYLAND
AMMAR    67 PRL  19  1071     +DAVIS,HWANG,DAGAN,DERRICK +     // NWL+ANL    JP
BARNES   67 PRL  19  964      +CORNAN,GCLDBERG,LEITNER + // BNL+SYRACUSE ICJP
```

η(1600) → 4π

3C ETA (16CO,JPG= +) I = C

THIS ENTRY CONTAINS 4PI PEAKS.
EVIDENCE NOT COMPELLING, OMITTED FRCM TABLE

3C ETA (16CO) MASS (MEV)

```
M       23 1610.0     4C.             KERNAN    65 HBC     C 2.7 PBAR P
M          1597.0     13.C            CLAYTON   67 HBC     C 2.5 PBAR P    1C/67
M          * . * . * . * . *
M   AVG    1598.2419  12.3634  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
```

3C ETA (16CO) WIDTH (MEV)

```
W          155.      85.             KERNAN    65 HBC     C 2.7 PBAR P
W           88.0     26.0            CLAYTON   67 HBC     C 2.5 PBAR P    1C/67
W          * . * . * . * . *
W   AVG    93.7324   24.8629  AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
```

3C ETA (16CO) PARTIAL DECAY MCDES

```
P1          ETA (1600) INTO 4PI                               S 8S 8S 8S 8
```

REFERENCES FCR ETA(1600)

```
KERNAN   65 PRL 15 803        +LYCN+CRAWLEY ////////////////////////// ICWA
CLAYTON  67  HEIDELBERG CONF. +MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
```

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

$\pi_A(1640)$ → 3π, 5π

34 PI (164C, JPG= -) I = 1

THIS ENTRY CONTAINS G=-1 PEAKS ANC THE R1 PEAK

FOR COMPILATION BY T. FERBEL, SEE REVIEW ON MESONS, PROC. 1966 BERKELEY CONFERENCE, P. 132

34 PI (164C) MASS (MEV)

M	C	30	1600.0		FORINO	65 DBC	C	4-5 PI+ C	
M	C	1700	EVENTS,COMPILED BY FERBEL.		ABC COLL.	66 HBC	+	8.0 PI+ P	
M	C	4000	EVENTS,COMPILED BY FERBEL.		BALTAY	66 HBC	+	8.4 PI+ P	
M	C	2000	EVENTS,COMPILED BY FERBEL.		SLATTERY	67 HBC	+	7.0 PI+ P	
M	C	110	1640.	20.	FERBEL	66 RVLE	+	7-8 PI P	11/66
M		20	1630.0	30.0	VETLITSKY	66 HBC	-	4.7 PI- P	
M			1662.0	16.0	ABC COLL.	67 HBC	+	8.0 PI+ P	10/67
M	*		1700.0	16.0	ABC COLL.	67 HBC	+	8.0 PI+ P,PI+F	10/67
M	*		1654.0	19.0	ARMENISE	67 DBC		C 5.1 PI+C	9/67
M			1665.0	10.0	CONTE	67 HBC	-	11.0 PI- P,PI-F	10/67
M	C		1689.	10.	DANYSZ	67 HBC		0 3,3,6 PEAR P	7/67
M	C	OBSERVED IN (CMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE							
M	C	NOTE THAT THE WIDTH OF THIS PEAK IS SMALL							
M	R		1630.	15.	DUBAL	67 HMS	-	7-12 PI- P	7/67
M	R	R1 PEAK FROM CERN HMS EXPT. DECAY MODES AND G PARITY UNKNOWN.							
M	R	NOTE THAT THE R1 HAS SMALLER WIDTH THAN THE OTHER ENTRIES.							
M			1610.	19.	LAMSA	67 HBC	-	8.0 PI-P, PI-F	11/67
M			* * * * * * * * *						
M	AVG		1653.5896	11.8236	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)				
			(SEE IDEOGRAM)						

34 PI (164C) WIDTH (MEV)

W	C	110	100.	20.	FERBEL	66 RVLE	+	7-8 PI P	11/66
W	R		21.	CR LESS	LEVRAT	66 HMS	-	7-12 PI- P	7/67
W	R	R1 PEAK FROM CERN HMS EXPT. DECAY MODES AND G PARITY UNKNOWN.							
W		20	100.		VETLITSKY	66 HBC	-		
W			120.0	45.0	ABC COLL.	67 HBC	+	8.0 PI+ P	10/67
W	*		170.0	50.0	ABC COLL.	67 HBC	+	8.0 PI+ P,PI+F	10/67
W	*		176.0	28.0	ARMENISE	67 DBC		C 5.1 PI+C	9/67
W			120.0	APPROX.	CONTE	67 HBC	-	11.0 PI- P,PI-F	10/67
W	C		38.	16.	DANYSZ	67 HBC		C 3,3,6 PEAR F	7/67
W	C	OBSERVED IN (CMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE							
W			100.	50.	30.	LAMSA	67 HBC	- 8.0 PI-P PI-F	11/67
W			* * * * * * * * *						
W	AVG		108.8276	29.8964	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

34 PI (164C) PARTIAL DECAY MODES

P1	PI(164C) INTO 3 PI	S 9S 9S 9
P2	PI(164C) INTO RHO PI	S 9U 9
P3	PI(164C) INTO ETA PI	S 9S14
P4	PI(164C) INTO 5 PI	
P5	PI(164C) INTO K K*(890)	S11U18
P6	PI(164C) INTO K KBAR PI	S11S11S 9
P7	PI(164C) INTO K KBAR	S11S11
P8	PI(164C) INTO F PI	L 5S 9

34 PI (164C) BRANCHING RATIOS

R1	*	PI(164C) INTO (K KBAR) / (3 PI)			NUM	7	
R1	*				DEN 1		
R1		.40 CR LESS (ESTIMATED FROM DATA OF DELTSCHMANN 66)					11/66
R2	*	PI(164C) INTO (RHO PI) / (3 PI)			NUM 2		
R2	*				DEN 1		
R2		0.40 CR LESS	FERBEL	66 HBC			11/66
R2	*	SEEN	ARMENISE	67		C 5.1 PI+ D	10/67
R3	*	PI(164C) INTO (F PI) / (3 PI)			NUM	6	
R3	*				DEN 1		
R3		INDICATION SEEN	LUBATTI	66 HLBC			11/66
R3		SEEN	ABC COLL.	67 HBC	+	8.0 PI+ P	10/67
R3		APPEARS DOMINANT	CONTE	67 HBC	-	11.0 PI- P	10/67
R4	*	R1 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS					
R4	*	0.37 / 0.59 / 0.04 FOCACCI 66 HMS -					

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REFERENCES FOR PI(1640)

FORINO 65 PL 19 68	+CESSARDLI+LENDINARA+/BOL+BARI+FIR+CRS+SAC
ABC COLL 66 COMM.TO T. FERBEL	FOR AUTHORS SEE PL 19 606(65)AACHEN,BERLIN,CERN
BALTAY C 66 COMM.TO T. FERBEL	+YEH,FRANZINI,KLNG,PLANO,RAVINI//COL.RUTGER
DEUTSCHM 66 PL 20 82	DEUTSCHMANN,STEINBERG + / AACH+BERLIN+CERN
ALSC CERN/HM.67-4	G.R.G.MORRISON ////////9////////// CERN
FERBEL 66 BERKELEY CONF.	SEE G. GOLDHABER, REVIEW ON MESONS /// LRL
ALSO PRIVATE COMM. FROM T. FERBEL	
FOCACCI 66 PL 17 690	CERN MISSING MASS SPECTROMETER GROUP//CERN
LEVRAT 66 PL 22 714	CERN MISSING MASS SPECTROMETER GROUP//CERN
ALSC SEGLINOT+ 66, PL 19 712	
LUBATTI 66 THESIS BERKELEY	H.J.LUBATTI ////////////////////////// LRL 1-2-
VETLITSK 66 PL 21 579	VETLITSKY,GLSZAVIN,KLIGER,ZCLGANOV+ //ITEP
ABC COLL 67 HEIDELBERG CONF.	////////AACHEN+BERLIN+CERN COLLABORATION
ARMENISE 67 HEIDELBERG CONF.	+GHIDINI,FORINO+//BARI+BCLCON+FIRENZ+CRSAY
CONTE 67 HEIDELBERG CONF.	+TOMASINI+CORDS+ //// GENCVA+HARV+MIL+SACL
DANYSZ 67 NC 51 A 601	DANYSZ+FRENCH+SIMAK ////////////// CERN
DUBAL 67 NP TO BE PUBL.	CERN MISSING MASS SPECTROMETER GROUP//CERN
LAMSA 67 PREPRINT	+CASON+BISWAS+DERADO+GROVES+ /// NOTREDAME
SLATTERY 67 NC 50A 377	+H.KRAYBILL, B.FORMAN, T.FERBEL//ROCH.+YALE

15 RHO (1650, JPG= +) I=1

$\rho(1650)$

ALSO KNOWN AS G MESON. (G=+1)

FOR POSSIBLE 4 PI MODES SEE ETA(16CC) AND RHO(1700)

FOR COMPILATION, SEE GOLDHABER, MESON REVIEW, PROC. 1966 BERKELEY CONFERENCE

15 RHO (1650) MASS (MEV)

M			1700.0	100.0	BELLINI	65 HLBC	C		
M			1620.0	20.0	DEUTSCHMA	65 HBC	+	8.0 PI+ P	
M			1640.0		FORINO	65 DBC	C		
M			1670.0	30.0	GOLDBERG	65 HBC	C		
M		70	1700.		CRENNELL	67 HBC		C 6.0 PI-P	3/67
M		50	1630.		CRENNELL	67 HBC	-	6.0 PI-P	3/67
M	C	MOST OF DATA ABOVE COMPILED BY GOLDHABER							
M	C	300	1650.0	COMP. BY GOLDHABER		66 RVLE		C 5-8 PI P, PI C	
M	C	50	1650.0	COMP. BY GOLDHABER		66 RVLE	+-	5-8 PI P+ PI C	
M			1691.0	31.0	ARMENISE	67 DBC		C 5.1 PI+C	9/67
M	R		1630.	15.	DUBAL	67 HMS	-	7-12 PI- P	7/67
M	R	R1 PEAK FROM CERN HMS EXPT. DECAY MODES AND G PARITY UNKNOWN.							
M	R	NOTE THAT THE R1 HAS MUCH SMALLER WIDTH THAN THE OTHER ENTRIES.							
M			1680.0	20.0	POIRIER	67 HBC		C 8.0 PI- P	11/67
M			* * * * * * * * *						
M	AVG		1659.6372	16.7549	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)				
			(SEE IDEOGRAM)						

15 RHO (1650) WIDTH (MEV)

W	A	13	80.0	40.0	DEUTSCHMA	65 HBC	+		
W	A		SUPERSEDED BY ABC COLL.67 BELOW						
W			40.0		FORINO	65 DBC	C		
W			180.0	40.0	GOLDBERG	65 HBC	C		
W	C	350	150.0	50.0	COMP. BY	GOLDHABER	66 RVLE	+-C 5-8 PI P, PI C	
W	R		21.	CR LESS		LEVRAT	66 HMS	- 7-12 PI- P	7/67
W	R	R1 PEAK FROM CERN HMS EXPT. DECAY MODES AND G PARITY UNKNOWN.							
W		70	200.		CRENNELL	67 HBC		C 6.0 PI-P	3/67
W		50	150.		CRENNELL	67 HBC	-	6.0 PI-P	3/67
W			115.0	40.0	ABC COLL.	67 HBC	+	8.0 PI+ P	10/67
W			184.0	39.0	ARMENISE	67 DBC		C 5.1 PI+C	9/67
W			226.0	68.0	46.0	POIRIER	67 HBC	C 8.0 PI- P	11/67
W			* * * * * * * * *						
W	AVG		169.2396	21.4086	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				
			(SEE IDEOGRAM)						

15 RHO (1650) PARTIAL DECAY MODES

P1	RHO (1650) INTO PI PI S 8S 8
P2	RHO (1650) INTO PI PI PI PI S 8S 8S 8S 8
P3	RHO (1650) INTO PI PI RHO S 8S 8U 9
P4	RHO (1650) INTO RHO RHO L 9U 9
P5	RHO (1650) INTO K KBAR S11S11
P6	RHO (1650) INTO OMEGA PI L 1S 8

15 RHO (1650) BRANCHING RATIOS

R1	*	R1 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS					
R1		0.37 / 0.59 / 0.04 FOCACCI 66 HMS -					
R3	*	RHO(1650) INTO (K KBAR) / (2 PI)			NUM	5	
R3	*				DEN 1		
R3		INDICATION SEEN	EHRLICH	66 HBC	+-C	7.9 PI- P	3/67
R3		PROBABLY SEEN	ABRAMS	67 HBC	C	4.25 K- P	6/67
R3		0.16 CR LESS	GRENNEL	67 HBC			4/67
R4	*	RHO(1650) INTO (OMEGA PI) / TOTAL			NUM	6	
R4	*				DEN 1234		
R4		INDICATION SEEN	GOLDHABER	65 RVLE	+-	3-4 PI+- P	7/67

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REFERENCES FOR RHO(1650)

BELLINI 65 NC 40 A 546	BELLINI,CI CORATC,DLIMINC,FICRINI //MILANC
DEUTSCHM 65 PL 18 351	DEUTSCHMANN,SCHULTE + //AACHEN+BERLIN+CERN
FORINO 65 PL 19 65	FORINC,GESSAROLI + //BOLCGNA+ORSAY+SACLAY
GOLDBERG 65 PL 17 354	GOLDBERG+/CERN+PARIS+ORSAY+MILANO+CEA-SACL
GOLDHABE 65 UCRL-16295	S. GOLDHABER ////////////////////////// LRL
(SEE ALSO GOLDHAGER 66)	
EHRLICH 66 PR 152 1194	R. EHRLICH,W.SELOVE,P.YUTA // PENNSYLVANIA
FOCACCI 66 PL 17 890	CERN MISSING MASS SPECTROMETER GROUP//CERN
GOLDHABE 66 BERKELEY CONF.	G.GOLDHABER, MESON REVIEW, P.101 ///// LRL
LEVRAT 66 PL 22 714	CERN MISSING MASS SPECTROMETER GROUP//CERN
ALSO SEGLINOT+ 66, PL 19 712	
ABC COLL 67 HEIDELBERG CONF.	//////////AACHEN+BERLIN+CERN COLLABORATION
ABRAMS 67 PRL 18 620	+KEHOE+GLASSER+SECHI-ZORN+WCLSKY/ MARYLANC
ARMENISE 67 HEIDELBERG CONF.	+GHIDINI,FORINO+//BARI+BCLCON+FIRENZ+CRSAY
CRENNELL 67 PRL 18 323	+HOUGH,KALBFLEISCH,LAI,BACHMAN+// BNL,CCNY I P
CRENNELL+SUGGEST JP=3- FROM THE PI PI SCATTERING ANGLE DISTRIBUTION	
DUBAL 67 NP TO BE PUBL.	CERN MISSING MASS SPECTROMETER GROUP//CERN
POIRIER 67 PREPRINT	+BISWAS,CASON,DERADO,KENNEY+//NOTRDAM+PENN

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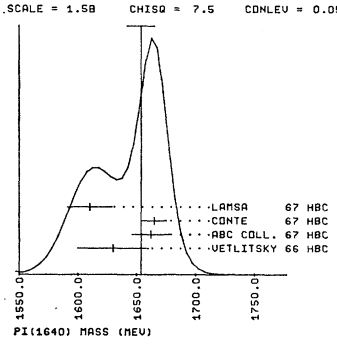
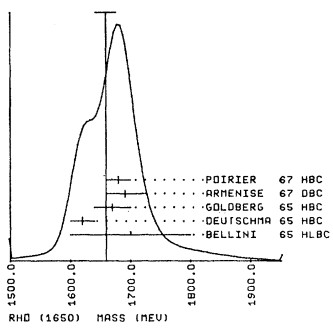
WEIGHTED AVERAGE = 1653.6 ± 11.8
SCALE = 1.58 CHISQ = 7.5 CONLEV = 0.059



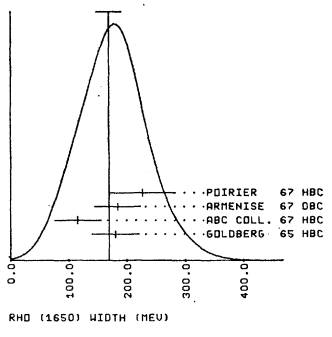
PI(1640) MASS (MEV)

WEIGHTED AVERAGE = 1659.6 ± 16.8
SCALE = 1.43 CHISQ = 6.1 CONLEV = 0.107



RHO (1650) MASS (MEV)

WEIGHTED AVERAGE = 169.2 ± 21.4
SCALE = 1.01 CHISQ = 3.0 CONLEV = 0.385



RHO (1650) WIDTH (MEV)

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

MESON RESONANCES

P_{21} (1715) $\rightarrow 4\pi, K^*\bar{K}$

92 RHO(1700,JPG= +) I = 1 OR 2

* THIS ENTRY CONTAINS 4PI, RHO 2PI, 2RHO AND K*KBAR PEAKS, AND THE
* R2. IF (2RHO 0) MODE IS TRUE, AN I=C RESONANCE EXISTS AS WELL.

* SEE SKETCH ON MESON TABLE.

92 MASS (MEV)

M		1680.0	APPROX.	CONTE	66 HBC	- 11 PI- P		10/67
M		1720.0		BALLAM	67 HBC	- 16 PI+-P,(4PI P)		10/67
M		1715.0	7.0	CLAYTON	67 HBC	CSEE NOTE R BELCW		10/67
M	80	1717.	7.	DANYSZ	67 HBC	CSEE NOTE R BELCW		5/67
M	R	SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND						
M	M	1700.	15.	DUBAL	67 MMS	- 7-12 PI- P		7/67
M	M	R2 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.						
M	K	1700.		FRENCH	67 HBC	C 3,3.6 PBAR P		7/67
M	K	OBSERVED IN NEUTRAL(K* KBAR) MODE (G-PARITY UNKNOWN)						
M		* * * * * * * * * *						
M	AVG	1716.0000	4.9497	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				

92 WIDTH (MEV)

W		160.0	APPROX.	CONTE	66 HBC	- 11 PI- P		10/67
W	M	30.	CR LESS	LEVRAT	66 MMS	- 7-12 PI- P		7/67
W	M	R2 PEAK FROM CERN MMS EXPT. DECAY MODES AND G PARITY UNKNOWN.						
W		58.0	14.0	CLAYTON	67 HBC	CSEE NOTE R BELCW		10/67
W	80	40.	12.	DANYSZ	67 HBC	CSEE NOTE R BELCW		5/67
W	R	SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND						
W		* * * * * * * * * *						
W	AVG	47.6235	9.1111	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				

92 RHO(1700) BRANCHING RATIOS

R1	*	R2 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS						
R1		0.42 / 0.56 / 0.01		FOCACCI	66 MMS			

REFERENCES FOR RHO(1700)

CONTE	66 PL 22 702	+TOMASINI+DITTMANN+/GENOVA+HAMB+MIL+SACLAY
FOCACCI	66 PL 17 890	CERN MISSING MASS SPECTROMETER GROUP//CERN
LEVRAT	66 PL 22 714	CERN MISSING MASS SPECTROMETER GROUP//CERN
ALSO	SEGLINOT+ 66, PL 19 712	
BALLAM	67 HEIDELBERG CONF.	+BRODY,CHADWICK,FRIES,GUIRAGOSSIAN+// SLAC
CLAYTON	67 HEIDELBERG CONF.	+MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
DANYSZ	67 PL 24B 3C9	+FRENCH+KINSCN+SIMAK+ ///// CERN+LIVERPCOL
DUBAL	67 NP TO BE PUBL.	+FOCACCI+KIENZLE+LECHANOINE+LEVRAT+ / CERN
FRENCH	67 CERN/TC/PH.66-31	+KINSCN+MCDONALC+RICCIFORC+ //// CERN+BIRM

R3(1750) 93 R3(1750) I=1,2

NOT YET A FIRMLY ESTABLISHED RESONANCE - OMITTED FROM TABLE

93 R3(1750) MASS(MEV)

M		1748.	16.	DUBAL	67 MMS	- 7-12 PI- P		7/67
M	F	1740.		FRENCH	67 HBC	(KC K+-) 3-4 PBAR P		7/67
M	F	SEE FIG. 9						

93 R3(1750) WIDTH (MEV)

W		38.	CR LESS	LEVRAT	66 MMS	- 7-12 PI- P		7/67

93 R3 BRANCHING RATIOS

R3	*	R3 MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS						
R3	C	0.14 / 0.80 / 0.05		FOCACCI	66 MMS	-		
R3	C	FRACTION INTO ONE CHARGED PROD.LARGER THAN GIVEN ABOVE. CF.DUBAL+67						

REFERENCES FOR R3(1750)

FOCACCI	66 PL 17 890	CERN MISSING MASS SPECTROMETER GROUP//CERN
LEVRAT	66 PL 22 714	CERN MISSING MASS SPECTROMETER GROUP//CERN
ALSO	SEGLINOT+ 66, PL 19 712	
DUBAL	67 NP TO BE PUBL.	CERN MISSING MASS SPECTROMETER GROUP//CERN
FRENCH	67 CERN/TC/PH.66-31	+KINSCN+MCDONALC+RICCIFORC+ //// CERN+BIRM

$\eta_A, I\geq 0$ (1830) $\rightarrow 4\pi, K^*\bar{K}$ ETA(183C) G=+1 (JPG=A +) I = C CR GREATER

* MAY BE NEUTRAL COMPONENT OF R4(183C) (I=1 OR 2)

* SEE SKETCH ON MESON TABLE

94 MASS (MEV)

M		1822.0	12.0	CLAYTON	67 HBC	CSEE NOTE R BELCW		10/67
M	110	1832.	6.	DANYSZ	67 HBC	CSEE NOTE R BELCW		5/67
M	R	SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND						
M		1820.	12.	FRENCH	67 HBC	CSEE NOTE K BELCW		7/67
M	K	SEEN IN 3.-3.6 PBAR P TO (KS KO PIO...). G PARITY UNKNOWN						
M		* * * * * * * * * *						
M	AVG	1828.3333	4.8990	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				

94 WIDTH (MEV)

W		60.0	34.0	CLAYTON	67 HBC	CSEE NOTE R BELCW		10/67
W	110	42.	11.	DANYSZ	67 HBC	CSEE NOTE R BELCW		5/67
W	R	SEEN IN 2.5-3 PBAR P. 2PI+2PI-,WITH 0,1,2 PI+PI- PAIRS IN RHOO BAND						
W		50.	23.	FRENCH	67 HBC	CSEE NOTE K BELCW		7/67
W	K	SEEN IN 3.-3.6 PBAR P TO (KS KO PIO...). G PARITY UNKNOWN						
W		* * * * * * * * * *						
W	AVG	44.7853	9.5260	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				

REFERENCES FOR ETA(1830)

CLAYTON	67 HEIDELBERG CONF.	+MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
DANYSZ	67 PL 24B 3C9	+FRENCH+KINSCN+SIMAK+ ///// CERN+LIVERPOOL
FRENCH	67 CERN/TC/PH.66-31	+KINSCN+MCDONALC+RICCIFORC+ //// CERN+BIRM

$\phi_A, I\geq 0$ (1830) PHI(183C) G=-1 (JPG=A.-) I = C CR GREATER

* MAY BE NEUTRAL COMPONENT OF R4(183C) (I=1 OR 2)
* I=1 IF (OMEGA RHO) MODE EXISTS.

* SEE SKETCH ON MESON TABLE

95 MASS (MEV)

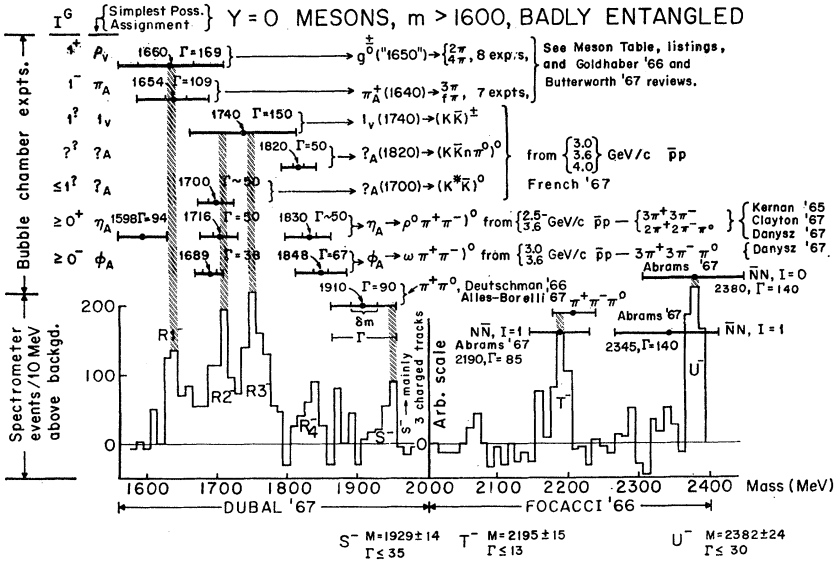
M	C	1848.	11.	DANYSZ	67 HBC	C 3,3.6 PBAR P		7/67
M	C	OBSERVED IN (OMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE						
M	K	1820.	12.	FRENCH	67 HBC	C 3,3.6 PBAR P		7/67
M	K	OBSERVED IN (KS KO PIO...) MODE (G-PARITY UNKNOWN)						

95 WIDTH (MEV)

W	C	67.	27.	DANYSZ	67 HBC	C 3,3.6 PBAR P		7/67
W	C	OBSERVED IN (OMEGA PI+ PI-) (AND POSSIBLY (OMEGA RHO(0))) MODE						
W	K	50.	20.	FRENCH	67 HBC	C 3-4 PBAR P		7/67
W	K	OBSERVED IN (KS KO PIO...) MODE (G PARITY UNKNOWN)						

REFERENCES FOR PHI(1830)

DANYSZ	67 NC 51A 8C1	DANYSZ+FRENCH+SIMAK ////////////////// CERN
FRENCH	67 CERN/TC/PH.66-31	+KINSCN+MCDONALC+RICCIFORC+ //// CERN+BIRM



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

R4(1830)

98 R4(1830) I=1,2

* NOT YET A FIRMLY ESTABLISHED RESONANCE.
* MAY BE CHARGED COUNTERPART OF ETA(183C) AND/OR PHI(1830).

* SEE SKETCH ON MESON TABLE

98 R4(1830) MASS(MEV)

M		1830.	15.	DUBAL	67 MMS	- 7-12 PI- P	7/67

98 R4(1830) WIDTH (MEV)

W	*	OBSERVED WIDTH SIMILAR TO EXPERIMENTAL RESOLUTION (30 MEV).					

REFERENCES FOR R4(183C)

DUBAL	67 NP TO BE PUBL.	CERN MISSING MASS SPECTROMETER GROUP//CERN

S(1930)

31 S(1930, JP= , I GTE 1) 3 CHARGED DECAY TRACKS

31 S (1930) MASS (MEV)

M	A	15 1910.0	20.0	DEUTSCHM	65 HBC	+	
M	A	SUPERSEDED BY ABC COLL.67 BELOW					
M		1929.0	14.0	CHIKOVANI	66 MMSP	-	
M		1900.0	45.0	ABC COLL.	67 HBC	+ 8.0 PI+ P	10/67
M	AVG	1926.4408	13.3680	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)			

M * PROBABLY THESE TWO ARE NOT THE SAME RESONANCE SINCE (A) MMS HAS LESS
M * THAN 20 PERCENT OF DECAYS WITH 1 CHARGED TRACK, WHEREAS HBC SEES DE-
M * CAY INTO (PI+ PIO), (B) THE WIDTHS ARE INCOMPATIBLE.

31 S (1930) WIDTH (MEV)

W	A	15 90.0	40.0	DEUTSCHM	65 HBC	+	
W	A	SUPERSEDED BY ABC COLL.67 BELOW					
W		35.0	CR LESS	CHIKOVANI	66 MMSP	-	
W		220.0	10.0	ABC COLL.	67 HBC	+ 8.0 PI+ P	10/67

31 D(SIGMA)/D(T) (MICROBARNS/(GEV/C)**2)

CS		35.0	12.0	FOCACCI	66 MMS	.22 LTE T LTE .36	

REFERENCES FOR S(193C)

DEUTSCHM 65 PL 18 351	+SCHULTZ+STEINBERG+ ///// AACH+BERLIN+CERN G=+
CHIKOVAN 66 PL 22 233	CERN MISSING MASS SPECTROMETER GROUP//CERN
FOCACCI 66 PRL 17 890	CERN MISSING MASS SPECTROMETER GROUP//CERN
ABC COLL 67 HEIDELBERG CONF.	////////////AACHEN+BERLIN+CERN COLLABORATION
MORRISON 67 CERN/PPE.67-4	D.R.O.MORRISON ////////////////////////CERN G=+

T(2195)

32 T(2200, JP= , I GTE 1) 3 CHARGED DECAY TRACKS

32 T(2200) MASS (MEV)

M		2195.0	15.0	CHIKOVANI	66 MMSP	-	
M	B	2190.	5.	ABRAMS	67 CNTR	S CHANNEL NBAR N	7/67
M	B	SEEN AS BUMP IN I=1 STATE. WIDTH MUCH LARGER THAN IN THE MMSP EXPT.					
M		2207.	13.	ALLES-BCR	67 HBC	C 5.7 PBAR P	12/66
M	A	ALLES-BORELLI 67 SEE NEUTRAL MODE ONLY (PI+PI-PIC)					
M		2160.0	9.0	CLAYTON	67 HBC	+- 2.5PBAR,A2+OMEGA	10/67
M	AVG	2179.0579\	15.0111	AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3)			

32 T(2200) WIDTH (MEV)

W		13.0	CR LESS	CHIKOVANI	66 MMSP	-	
W	B	85.		ABRAMS	67 CNTR	S CHANNEL NBAR N	7/67
W	B	SEEN AS BUMP IN I=1 STATE. WIDTH MUCH LARGER THAN IN THE MMSP EXPT.					
W		62.	52.	ALLES-BCR	67 HBC	C 5.7 PBAR P	12/66
W		66.0	26.0	CLAYTON	67 HBC	+- 2.5PBAR,A2+OMEGA	10/67
W	AVG	65.2600	23.2551	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)			

32 D(SIGMA)/D(T) (MICROBARNS/(GEV/C)**2)

CS		29.0	10.0	FOCACCI	66 MMS	.22 LTE T LTE .36	

32 SIGMA (MB) FOR FORMATION BY NUCLEON ANTINUCLEON

CS		6.		ABRAMS	67 CNTR		7/67

REFERENCES FOR T(220C)

CHIKOVAN 66 PL 22 233	CERN MISSING MASS SPECTROMETER GROUP//CERN
FOCACCI 66 PRL 17 890	CERN MISSING MASS SPECTROMETER GROUP//CERN
ABRAMS 67 PRL 18 1209	+COOL+GIACOMELLI+KYCIA+LECKTIC+LI+ /// BNL
ALLES-BC 67 NC 50 A 776	ALLES-BCRELLI,FRENCH,FRISK,+ /// CERN+BONN G=-
CLAYTON 67 HEIDELBERG CONF.	+MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
MORRISON 67 CERN/PPE.67-4	D.R.O.MORRISON ////////////////////////CERN G=+

$N\bar{N}_{I=0}(2380)$

+ NBAR (2380) (I=0)

EVIDENCE FOR RESONANT STATE NOT YET COMPELLING.
OMITTED FROM TABLE.

99 MASS

M		2380.	10.	ABRAMS	67 CNTR	S CHANNEL NBAR N	7/67

99 WIDTH

W		140.		ABRAMS	67 CNTR	S CHANNEL NBAR N	7/67

99 SIGMA (MB) FOR FORMATION BY NUCLEON ANTINUCLEON

CS	*	2.		ABRAMS	67 CNTR		7/67

REFERENCES FOR N NBAR (238C)

ABRAMS 67 PRL 18 1209	+COOL+GIACOMELLI+KYCIA+LECNTIC+LI+ /// BNL

U(2380)

33 U(2380, JP= , I GTE 1) 1,3,5 CHARGED TRACKS

33 U(2380) MASS (MEV)

M		2382.0	24.0	CHIKOVANI	66 MMSP	-	
M	B	2345.	10.	ABRAMS	67 CNTR	S CHANNEL NBAR N	7/67
M	B	SEEN AS BUMP IN I=1 STATE. WIDTH MUCH LARGER THAN IN THE MMSP EXPT.					
M		2324.0		CLAYTON	67 HBC	+- 2.5PBAR,A2+OMEGA	10/67

33 U(2380) WIDTH (MEV)

W		30.0	OR LESS	CHIKOVANI	66 MMSP	-	
W	B	140.		ABRAMS	67 CNTR	S CHANNEL PBAR N	7/67
W	B	SEEN AS BUMP IN I=1 STATE. WIDTH MUCH LARGER THAN IN THE MMSP EXPT.					
W		18.0	24.0	CLAYTON	67 HBC	+- 2.5PBAR,A2+OMEGA	10/67

33 D(SIGMA)/D(T) (MICROBARNS/(GEV/C)**2)

CS		42.0	14.0	FOCACCI	66 MMS	.28 LTE T LTE .36	

33 SIGMA (MB) FOR FORMATION BY NUCLEON ANTINUCLEON

CS	*	3.		ABRAMS	67 CNTR		7/67

33 U MESON BRANCHING RATIOS

R1	*	U- MESON FRACTION INTO ONE / THREE / FIVE OR MORE CHARGED TRACKS					
R1		0.30 / 0.45 / 0.25		FOCACCI	66 MMS	-	

REFERENCES FOR U(238C)

CHIKOVAN 66 PL 22 233	CERN MISSING MASS SPECTROMETER GROUP//CERN
FOCACCI 66 PRL 17 89C	CERN MISSING MASS SPECTROMETER GROUP//CERN
ABRAMS 67 PRL 18 1209	+COOL+GIACOMELLI+KYCIA+LECKTIC+LI+ /// BNL
CLAYTON 67 HEIDELBERG CONF.	+MASON,MUIRHEAD,FILIPPAS+// LIVPOOL+ATHENS
MORRISON 67 CERN/PPE.67-4	D.R.O.MORRISON ////////////////////////CERN G=+

$K^{\pm}$

10 CHARGED K (494, JP=C-) I=1/2

SEE LISTINGS OF STABLE PARTICLES

K^{0}

11 NEUTRAL K (498,JP=0-) I=1/2

SEE LISTINGS OF STABLE PARTICLES

K(725)

17 KAPPA (725,JP=) I=1/2

EVIDENCE NOT COMPELLING. OMITTED FROM TABLE.
FOR A COMPILATION, SEE APPENDIX A OF JAN 67 EDITION
(RMP 39, 1) OF THIS DATA SUMMARY.

$K^{*}(892)$

18 K* (89C,JP=1-) I=1/2

18 K* (890) MASS (MEV)

M		898.0	5.0	CHACWICK	63 HBC	+	
M		891.0	3.0	FERRO-LUZ	65 HBC	+	
M		895.	3.	BCMSE	67 HBC	+ 2.3 K+P	7/67
M		891.	2.	DE BAERE	67 HBC	+ 3.5 K+P (KO PI+)	7/67
M		892.5	2.5	DE BAERE	67 HBC	+ 3.5 K+P (K+ PIC)	7/67
M		892.	4.	GOSHAW	67 HBC	+ 3.5 K+ P	7/67
M		898.	4.	SALLSTROM	67 HBC	+ 3. K+ P (KO PI+)	7/67
M		883.	5.	SALLSTROM	67 HBC	+ 3. K+ P (K+ PIC)	7/67
M		890.	2.	BARLOW	67 HBC	+- 1.2 PBAR P	11/66
M		889.	3.	BARLOW	67 HBC	+- 1.2 PBAR P	11/66
M		896.0	5.0	CONFERTC	67 HBC	+- 0. PBAR P	9/67
M	3870	891.0	1.0	WOJCICKI1	64 HBC	-	
M		895.0	3.0	GELSEMA	65 HBC	-	
M		896.0	3.0	ABCLV CCL	67 HBC	10.1 K- P	10/67
M		891.	4.	FICENEC	67 HBC	- 1.3 K-P (K-PIC)	9/67
M		887.	3.	FICENEC	67 HBC	- 1.3 K-P (KOPI-)	9/67
M		896.0	4.0	SCHWEINGR	67 HBC	- 4.1 K-P	9/67
M		892.0	2.0	SCHWEINGR	67 HBC	- 5.5 K-P	9/67
M	AVG	891.6754	.6041	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C) (SEE IDEOGRAM)			
M	2CO	880.0		ALEXANDER	62 HBC	+ C	
M		895.0	2.0	FERROLUZZ	65 HBC	+ C	
M		895.0		WANGLER	65 HBC	+ C 3.0 PI- P	
M		894.	5.	FRENCH	67 HBC	+-0 3-4 PBAR P	6/67
M	AVG	894.8621	1.8570	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)			

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

M	70	897.0	10.0		CCLLEY	62 HBC	C		
M	200	892.0	2.0		KRAEMER	63 HBC	C		
M	150	885.0			SMITH	63 HBC	C		
M		889.5	2.5		ADELMAN	65 HBC			
M	160	891.	5.		CRENNELL	66 HBC	C 6.0 PI-P		
M		899.	4.		BARLOW	67 HBC	C 1.2 PBAR P	11/66	
M		897.	4.		BARLOW	67 HBC	C 1.2 PBAR P	11/66	
M		869.0	5.0		CONFORTO	67 HBC	C 0. PBAR P	9/67	
M		894.7	1.3		DAUBER	67 HBC	C 2.0 K- P	12/66	
M		895.	2.		FICENEC	67 HBC	C 1.3 K-P (K-PI+)	9/67	
M		892.0	4.0		GEORGE	67 HBC	C 5.0 K+ P	11/67	
M		896.0	4.0		SCHWEINGR	67 HBC	C 4.1 K-P	9/67	
M		903.0	4.0		SCHWEINGR	67 HBC	C 5.5 K-P	9/67	
M									
M	AVG	894.131C	.9136	AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.2)					
				(SEE IDEOGRAM)					

18 K*(0) - K*(+) MASS DIFF. (MEV)

D		6.3	4.1		BARASH	67 HBC	0 PBAR P		8/67

18 K* (890) WIDTH (MEV)

W		46.0	8.0		CHADWICK	63 HBC	+		
W		47.0	4.0		FERRO-LUZ	65 HBC	+		
W		50.	5.		BOMSE	67 HBC	+ 2.3 K+P		7/67
W		56.	4.5		DE BAERE	67 HBC	+ 3.5 K+P (KC PI+)		7/67
W		53.	8.		DE BAERE	67 HBC	+ 3.5 K+P (K+ PIC)		7/67
W		27.	12.	9.	GCSHAW	67 HBC	+ 3.5 K+ P		7/67
W		66.	10.		SALLSTROM	67 HBC	+ 3. K+ P (KC PI+)		7/67
W		47.	10.		SALLSTROM	67 HBC	+ 3. K+ P (K+ PIC)		7/67
W	3870	46.0	3.0		WOJCICKI1	64 HBC	-		
W		50.0	15.0		GELSEMA	65 HBC	-		
W		45.0	7.0		ABCLV CCL	67 HBC	10.1 K- P		10/67
W		58.	16.		FICENEC	67 HBC	- 1.3 K-P (K-PIC)		9/67
W		44.	13.		FICENEC	67 HBC	- 1.3 K-P (KOPI-)		9/67
W		41.0	8.0		SCHWEINGR	67 HBC	- 4.1 K-P		9/67
W		47.0	4.0		SCHWEINGR	67 HBC	- 5.5 K-P		9/67
W		44.	7.		BARLOW	67 HBC	+- 1.2 PBAR P		11/66
W		43.	9.		BARLOW	67 HBC	+- 1.2 PBAR P		11/66
W		53.	7.		BARLOW	67 HBC	+- 1.2 PBAR P		11/66
W		43.			CONFORTO	67 HBC	+- 0. PBAR P		9/67
W	200	60.0	5.0		ALEXANDER	62 HBC	+ C		
W		51.8	3.5		FERROLUZZ	65 HBC	+ C		
W		40.0			WANGLER	65 HBC	+ C 3.0 PI- P		
W		60.	10.		FRENCH	67 HBC	+-C 3-4 PBAR P		6/67
W	70	60.0	10.0		CCLLEY	62 HBC	C		
W	200	50.0	5.0		KRAEMER	63 HBC	C		
W	150	50.0			SMITH	63 HBC	C		
W		51.0	3.0		ADELMAN	65 HBC			
W	160	49.	6.		CRENNELL	66 HBC	C 6.0 PI-P		
W		53.	13.		BARLOW	67 HBC	C 1.2 PBAR P		11/66
W		34.	8.		BARLOW	67 HBC	C 1.2 PBAR P		11/66
W		43.			CONFORTO	67 HBC	C 0. PBAR P		9/67
W		44.	4.		DAUBER	67 HBC	C 2.0 K- P		12/66
W		52.	12.		FICENEC	67 HBC	C 1.3 K-P (K-PI+)		9/67
W		51.0	11.0		SCHWEINGR	67 HBC	C 5.5 K-P		9/67
W		53.0	11.0		SCHWEINGR	67 HBC	C 4.1 K-P		9/67
W									
W	AVG	49.2129	1.0441	AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)					

18 K* (890) PARTIAL DECAY MODES

P1	K* INTO K PI	S10S 8
P2	K*(890) INTO (K PI PI)	S10S 8S 8

16 K* (890) BRANCHING RATIOS

R1	*	K*(890) INTO (K PI PI)/(K PI)		(P2)/(P1)	
R1		0 0.002 CR LESS	WOJCICKI2 64 HBC	-	

REFERENCES FOR K*

ALSTON	61 PRL 6 300	ALSTON,ALVAREZ,EBERHARD,GCCC,GRAZIANC+/LRL
ALEXANDE	62 PRL 8 447	ALEXANDER,KALBFLEISCH,MILLER,G SMITH //LRL
COLLEY	62 CERN CONF 315	D COLLEY,N GELFAND + //// CCLUMBIA+RUTGERS
CHADWICK	63 PL 6 309	CHADWICK,CRENNELL,DAVIES,BETTINI+/OXF+PADU
GOLDHABE	63 ATHENS CONF 92	SULLANITH GOLDHABER ////////////////// LRL
KRAEMER	63 ATHENS CONF 130	R KRAEMER L MADANSKY + //// JOHNS HOPKINS
SMITH	63 PRL 10 130	SMITH,SCHWARTZ,MILLER,KALBFLEISCH,HUF+/LRL
WOJCICK1	64 PR 135 B 464	STANLEY G WOJCICKI ////////////////// LRL
WOJCICK2	64 PR 135 B 495	S WOJCICKI,M ALSTON,G KALBFLEISCH //// LRL
ADELMAN	65 ATHENS 527	STUART LEE ADELMAN // CAVENDISH
FERROLUZ	65 NC 36 1101	FERRO-LUZZI,GEORGE,HENRI,JONGEJANS // CERN
FERROLLZ	65 NC 39 417	FERRO-LUZZI,GEORGE,GOLDSCHMIDT-CLER+//CERN
GELSEMA	65 THESIS	E.S.GELSEMA (SEE ALSO PL 10 341) / AMSTERD
WANGLER	65 PR 137 B 414	WANGLER,ERWIN,WALKER ////////// WISCONSIN
CRENNELL	66 BERKELEY CONF	+KALBFLEISCH,LAI,SCARR,SCHMANN+////// BNL
ABCLV CC	67 HEIDELBERG CONF.	AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
BARASH	67 PR 156 1399	BARASH,KIRSCH,MILLER,TAN /////////CCLUMBIA
BARLOW	67 NC 50 A 701	+PONTANET,D-ANDLAU+/CERN+CCF+IDR+LIVERPOOL
BOMSE	67 PR 158 1298	+BORENSTEIN+COLE+GILLESPIE+ / JOHN HOPKINS
CONFORTC	67 PREPRINT TO NP	+MARECHAL,MCNTANET+//CERN+CF+IPN+LIVERPOOL
DAUBER	67 PR 153 1403	+SCHLEIN,SLATER,TICHO ////////////////// UCLA
DE BAERE	67 NC 51 A 401	+GOLDSCHMIDT-CLERMONT,HENRI+ /// BRLX+CERN
FICENEC	67 PREPRINT	+PULSIZER+SWANSON+TROWER ////////// URBANA
FRENCH	67 CERN/TC/PH.66-31	+KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
GEORGE	67 NC 49A 9	+GOLDSCHMIDT-CLERMONT+HENRI+ /// CERN+BRUX
GOSHAW	67 PREPRINT	+ERWIN+WALKER+WEINBERG ////////////// WISC
SALLSTRC	67 NC 49A 348	SALLSTROM+OTTER+EKSPONG //////// STOCKHOLM
SCHWEING	67 SUBMITTED TO PR	SCHWEINGRUBER,DERRICK,FIELDS,AMMAR+/ANL+NW
ABCLV CC	67 HEIDELBERG CONF.	AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
BARASH	67 PR 156 1399	BARASH,KIRSCH,MILLER,TAN /////////CCLUMBIA
BARLOW	67 NC 50 A 701	+PONTANET,D-ANDLAU+/CERN+CCF+IDR+LIVERPOOL
BOMSE	67 PR 158 1298	+BORENSTEIN+COLE+GILLESPIE+ / JOHN HOPKINS
CONFORTC	67 PREPRINT TO NP	+MARECHAL,MCNTANET+//CERN+CF+IPN+LIVERPOOL
DAUBER	67 PR 153 1403	+SCHLEIN,SLATER,TICHO ////////////////// UCLA
DE BAERE	67 NC 51 A 401	+GOLDSCHMIDT-CLERMONT,HENRI+ /// BRLX+CERN
FICENEC	67 PREPRINT	+PULSIZER+SWANSON+TROWER ////////// URBANA
FRENCH	67 CERN/TC/PH.66-31	+KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
GEORGE	67 NC 49A 9	+GOLDSCHMIDT-CLERMONT+HENRI+ /// CERN+BRUX
GOSHAW	67 PREPRINT	+ERWIN+WALKER+WEINBERG ////////////// WISC
SALLSTRC	67 NC 49A 348	SALLSTROM+OTTER+EKSPONG //////// STOCKHOLM
SCHWEING	67 SUBMITTED TO PR	SCHWEINGRUBER,DERRICK,FIELDS,AMMAR+/ANL+NW

$K_V(1080)$ 19 KV (1080)

VERY TENTATIVE EVIDENCE HAS BEEN RCLNC BY
DE BAERE 67 NC 49A 374 +DEBAISIEUX+FAST+FILIPPAS+ ///// CERN+BRLX
CMITTED FROM TABLE.

$K_{3/2}(1175)$ 24 KA 3/2 (1175,JP=) I = 3/2

EVIDENCE NOT YET COMPELLING, OMITTED FROM TABLE.
* FOR COMPILATIONS + NEG. EVIDENCE, SEE ROSENFELD, OXFORD
* 1965 SUPPL., P 17.
* BARNHAM 67 AND GOSHAW 67 SEE DOUBLY CHARGED (K*+PI+) MODE

24 KA 3/2 (1175) MASS (MEV)

M	*	23	1175.0			WANGLER	64 HBC		
M	*	15	1160.0	10.0		MILLER	65 HBC		
M	*		1180.0			GCSHAW	67 HBC ** 3.5 K+ P		11/67
M	B		1200.0			BARNHAM	67 HBC ** 10.0 K+P		11/67
M	B	SEEN IN (KO PI+ PI+) FROM SIX-BODY FINAL STATE WITH P PI- PIO							11/67

24 KA 3/2 (1175) WIDTH (MEV)

W	*	23	25.0	CR LESS		WANGLER	64 HBC		
W	*	15	35.0	10.0		MILLER	65 HBC		
W	*		50.0	APPROX.		GOSHAW	67 HBC		

REFERENCES FOR KA3/2(1175)

WANGLER	64 PL 9 71	T P WANGLER,A R ERWIN,W C WALKER //WISCONS
MILLER	65 PL 15 74	MILLER,KOVACS,MCILWAIN,PALFREY +/// PURDUE
ROSENFEL	65 OXFORD CONF 56	A H ROSENFELD ////////////////// LRL--RVUE
BARNHAM	67 HEIDELBERG CONF	+EEANEY,HUGHES,ECWLER+ // EIRM+GLASGCW+CXF
GOSHAW	67 PREPRINT	+ERWIN+WALKER+WEINBERG ////////////// WISC
	ALSC 66 PRL 16 1069	BISHOP,GOSHAW,ERWIN,THOMPSON,WALKER+//WISC

$K_{3/2}(1270)$ 25 KA3/2(1265,JP=) I=3/2

EVIDENCE NOT YET COMPELLING, OMITTED FROM TABLE
* FOR COMPILATIONS + NEG. EVIDENCE, SEE ROSENFELD, OXFORD
* 1965 SUPPL., AND G. GOLDHABER, BERKELEY CONF. 1966.

KA3/2 (1265) MASS (MEV)

M		1265.	10.			FRENCH	67 HBC	I=3/2 3-4 PBAR P	6/67

KA3/2 (1265) WIDTH (MEV)

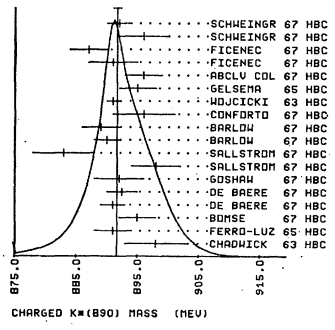
W		50.	20.			FRENCH	67 HBC	I=3/2 3-4 PBAR P	6/67

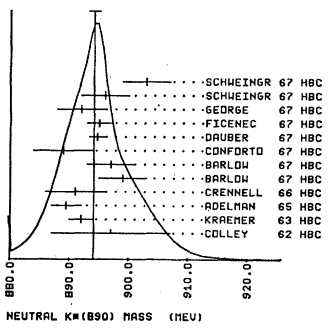
KA3/2 (1265) PARTIAL DECAY MODES

P1	KA(127C) INTC K PI	S11S 9
P2	KA(127C) INTC K*(89C) PI	L18S 9
P3	KA(127C) INTC K RHO	S11U 9

REFERENCES FOR K*3/2 (1265)

ROSENFEL	65 OXFORD CONF 56	A H ROSENFELD ////////////////// LRL--RVUE
GOLDHABE	66 BERKELEY CONF	G.GOLDHABER,SAMIOS,ASTIER,SHEN,LAI.MESON REVIEW
FRENCH	67 CERN/TC/PH.66-31	+KINSON+MCDONALD+RIDDIFORD+ //// CERN+BIRM
SEE ALSC	64 PL 12 65	BCCK,FRENCH,KINSON,BADIER+//CERN+PAR+ LCNC



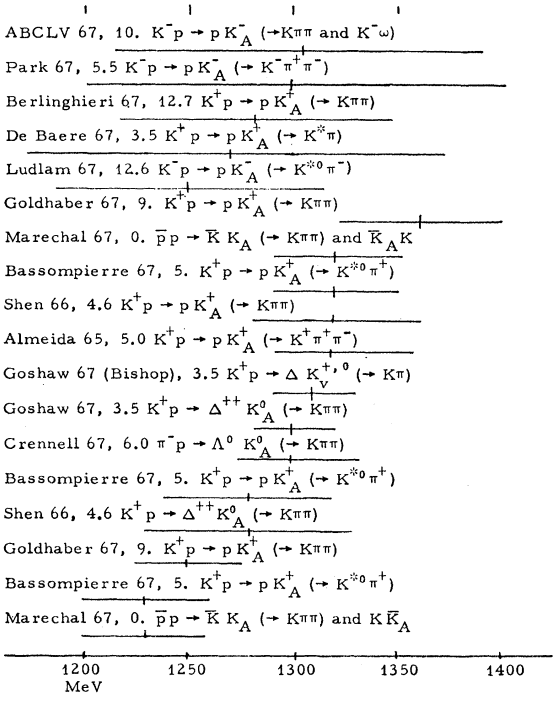


ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

THERE EXIST MANY PAPERS REPORTING A BROAD I=1/2 (K PI PI) ENHANCEMENT IN THE MASS REGION 1.2-1.5 GEV. THE BUMP NEAR 1.4 GEV IS USUALLY ASSOCIATED WITH THE WELL-ESTABLISHED KV(1420), WHICH IS CLEARLY SEEN IN (K PI) DECAY. THE 1.2-1.4 GEV ENHANCEMENT IS PROBABLY DUE TO SOME COMBINATION OF CDCK EFFECT AND ONE, TWO, OR THREE REAL RESONANCES. FOR CONVENIENCE OF PRESENTATION, WE HAVE GROUPED THE DATA UNDER THE NAMES OF THREE PARTICLES AND ONE PSEUDO-PARTICLE, RESPECTIVELY KA(123C), KA(1280), KA(1320), AND KA(120C-135C). UNDER THE LAST CATEGORY WE HAVE LISTED ALL EXPERIMENTS THAT REPORT A BROAD PEAK, WITH A WIDTH GREATER THAN 100 MEV. THE FOLLOWING FIGURE SHOWS THE MASSES AND WIDTHS OF REPORTED PEAKS.

NOTE THAT MARECHAL 67 SEES (K PI PI) PEAKS AT 1220 AND 1320 MEV IN ANTIPROTON ANNIHILATION AT REST, AND CRENNELL 67 SEES A (K PI PI) PEAK AT 1300 MEV FOR PI- K INTO LAMBDA K PI PI. NEITHER OF THESE PROCESSES ALLOWS A TRADITIONAL CDCK EFFECT.

Reported Masses and Widths of $K\pi\pi$ Resonances, 1230-1360 MeV



K_A (1200-1350) KA(120C-135C) I=1/2

SEE NOTE ABOVE

28 KA(1200-135C) MASS (MEV)

M		1304.0	8.0		ABCLV CCL 67 HBC	10.0 K- P		10/67
M		1270.			BARNHAM 67 HBC	+ 10. K+PIK PI PI)		11/67
M	B	1330.			BARNHAM 67 HBC	C 10.0 K+ P		11/67
M	B	SEEN IN (KO PI+ PI-) FROM SIX-BODY FINAL STATE WITH P PI+ PI0						11/67
M		200 1280.	20.		BERLINGHIERI 67 HBC	+ 12.7 K+ P		7/67
M	BERLINGHIERI VALUE IS FROM (K* PI) MODE. THE (K RHO) MASS PEAKS AT 1320,							
M	AN EFFECT THAT THEY ATTRIBUTE TO KINEMATICS NEAR (K RHO) THRESHOLD.							
M		1270.	APPROX.		DE BAERE 67 HBC	+ 3.5 K+ P		7/67
M		1250.0	30.0		LUDLAM 67 HBC	12.6 K-P		9/67
M		1300.0			PARK 67 HBC	5.5 K- P		10/67
M		. . . . .						
M	AVG	1297.7617	10.1080	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)				

28 KA(1200-135C) WIDTH (MEV)

W		176.0	33.0		ABCLV CCL 67 HBC	10.0 K- P		10/67
W		170.			BARNHAM 67 HBC	+ 10. K+PIK PI PI)		11/67
W	200	130.	15.		BERLINGHI 67 HBC	+ 12.7 K+ P		7/67
W		200.	APPROX.		DE BAERE 67 HBC	+ 3.5 K+ P		7/67
W		130.0	20.0		LUDLAM 67 HBC	12.6 K-P		9/67
W		200.0			PARK 67 HBC	5.5 K- P		10/67
W		. . . . .						
W	AVG.	135.6058	11.2775	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

28 KA(1200-135C) PARTIAL DECAY MODES

P1	*	KA(120C-1350) INTO K*(89C) PI	L18SC8
P2	*	KA(120C-1350) INTO K RHO	S11LC9
P3	*	KA(120C-1350) INTO K PI	S11SC8
P4	*	KA(1200-1350) INTO K ETA	S11S14
P5	*	KA(1200-1350) INTO K OMEGA	S11UC1

28 KA(1200-135C) BRANCHING RATIOS

R1		KA(1200-1350) INTO K*(89C) PI AND K RHO (OVERLAPPING BANDS)						
R1	2C0	1.0			BERLINGHI 67 HBC	+		7/67
R2		KA(1200-1350) INTO (K PI) / TOTAL						
R2		0.02 CR LESS			BERLINGHI 67 HBC	+ 12.7 K+ P		11/67
R3		KA(1200-1350) INTO (K ETA) / TOTAL						
R3		0.02 CR LESS			BERLINGHI 67 HBC	+ 12.7 K+ P		11/67
R4		KA(1200-1350) INTO (K OMEGA) / TOTAL						
R4		INDICATION SEEN			ABCLV CC 67 HBC	- 1C K- P		11/67
R4		0.02 CR LESS			BERLINGHI 67 HBC	+ 12.7 K+ P		11/67
R5		KA(120C-1350) INTO (K RHO) / (K*(89C) PI)						
R5		0.51 0.25			BERLINGHI 67 HBC	+ 12.7 K+ P		11/67
R5	C	0.17 0.10	0.07	CHIEN 67 HBC	+ 7.3 K+ F			11/67
R5	C	INTERFERING BANDS TAKEN INTO ACCOUNT. NOT CORR.FOR PHASE SP. RATIC.						
R6		KA(120C-1350) INTO (K PI) / (K*(89C) PI)						
R6		0.21 CR LESS			DE BAERE 67 HBC			11/66

REFERENCES FOR KA (1200-135C)

ABCLV CC 67 HEIDELBERG CONF. AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
SEE ALSC 66 PL 22 357 BARTSCH,DEUTSCHMANN,MORRISCN+ // AACLLICIV
BARNHAM 67 HEIDELBERG CONF +BEANEY,HUGHES,BCWLER+ // BIRM+GLASGCW+OXF
BERLINGH 67 PRL 18 1067 BERLINGHIERI+FARBER+FERBEL+FCRMAN+ // RCCH IJP
CHIEN 67 PREPRINT TC PRL +CALBER+MALAMUD+MELLEMA+SCHLEIN+ //// UCLA JP
DE BAERE 67 NC 49A 374 +CEBAISELCX+FAST+FILIPPAS+ ///// CERN+BRUX
AND PRIVATE COMMUNICATION BY B. JONGEJANS
LUDLAM 67 HEIDELBERG CONF. +LACH,SANDWEISS,TAFT // YALE
PARK 67 HEIDELBERG CONF +KIM,CHANDLER,WANGLER,AMMAR+ // ILL+ANL+NW

K_A (1230) 2C KA (123C,JP=) I=1/2

FORMERLY CALLED C MESON
(JP = 1+ FAVORED)

SEE NOTE PRECEDING KA(120C-135C)

2C KA (123C) MASS (MEV)

M		1230.0	15.0		BASSCMPIE 67 HBC	+ 5. K+ P		11/67
M		1230.0			BRITISH 67 HBC	+ 10.0 K+ P		1C/67
M		1250.0	1C.0		GOLDHABER 67 HBC	9.0 K+ F		1C/67
M		1230.0	15.0		MARECHAL 67 HBC	+-C 0. PBAR P		9/67
M		. . . . .						
M	AVG	1240.5662	7.2761	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				

2C KA (123C) WIDTH (MEV)

W		60.0	20.0		BASSCMPIE 67 HBC	+ 5. K+ P		11/67
W		50.0	20.0		GOLDHABER 67 HBC	9.0 K+ F		1C/67
W		60.0			MARECHAL 67 HBC	+-C 0. PBAR P		9/67
W		. . . . .						
W	AVG	55.0000	14.1421	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.C)				

2C KA (123C) PARTIAL DECAY MODES

P1		KC INTO K RHO	S1GU 9
P2		KC INTO K* PI	L18S 8
P3		KC INTO K PI PI	S11S 8S 8

2C KA (123C) BRANCHING RATIOS

R1	*	KA(1230) INTO (K RHO)/TOTAL (UNITS OF 10**-2) (P1)/TOTAL						
R1		75.0	10.0		ARMENTERO 64 HBC			
R2	*	KA(1230) INTO (K* PI)/TOTAL (UNITS OF 10**-2) (P2)/TOTAL						
R2		25.0	10.0		ARMENTERO 64 HBC			

REFERENCES FOR KA (1230)

ARMENTER 64 DUBNA CONF 1 577 ARMENTEROS,EDWARDS,D ANDLAL +//// CERN+CDF
SEE ALSO PL 9, 207
ALSC DUBNA CONF 1 617 R ARMENTEROS (RAPPORTEUR)
SEE ALSC 66 PR 145 1095 BARASH,KIRSCH,MILLER,TAN // COLUMBIA

BASSCMPI 67 PREPRINT TC PL BASSOMPIERRE,GOLDSCHMIDT+ //CERN+BRLX+BIRM IJP
BRITISH 67 HEIDELBERG CONF // BIRMINGHAM+GLASGOW+CXFORD
GOLDHABER67 PRL 19 972 G.GOLDHABER,FIRESTONE,SHEN // LRL
MARECHAL 67 HEIDELBERG CONF. +BARLOW,F.JAMES+//CERN+CDF+IPN.PARIS+LPOOL

K_A (1280) 2G KA(1280,JP=) I=1/2

SEE NOTE PRECEDING KA(120C-1350)

2G KA(1280) MASS (MEV)

M		35 1280.0	10.0		BASSCMPIE 67 HBC	+ 5. K+ P		11/67
M	N	45 1300.			CRENNELL 67 HBC	C 6 PI- P		7/67
M	N	1300.	10.		GOSHAW 67 HBC	C 3.5 K+ F		7/67
M	N	THESE PEAKS MAY BETTER BE ASSOCIATED WITH THE KA(1320).						
M	S	1280.0			SHEN 66 HBC	+ C 4.6 K+P		11/67
M	S	SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATED WITH KA(1320).						
M	G	1250.0	10.0		GOLDHABER 67 HBC	9.0 K+ F		10/67
M	G	THIS PEAK MAY BETTER BE ASSOCIATED WITH THE KA(123C).						
M	B	1310.	10.		GOSHAW 67 HBC	+ C 3.5 K+ F (K PI)		11/67
M	B	SEEN IN (K PI) MODE OF 4-BODY FINAL STATE, FROM WORK OF BISHOP.						

2G KA(1280) WIDTH (MEV)

W		35 80.0	20.0		BASSCMPIE 67 HBC	+ 5. K+ P		11/67
W	N	45 60.			CRENNELL 67 HBC	C 6 PI- P		7/67
W	N	40.	15.		GOSHAW 67 HBC	C 3.5 K+ F		7/67
W	N	THESE PEAKS MAY BETTER BE ASSOCIATED WITH THE KA(1320).						
W	S	100.0	20.0		SHEN 66 HBC	+ C 4.6 K+ P		11/67
W	S	SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATED WITH KA(1320).						
W	G	50.0	20.0		GOLDHABER 67 HBC	9.0 K+ F		10/67
W	G	THIS PEAK MAY BETTER BE ASSOCIATED WITH THE KA(123C).						
W	B	40.	20.		GOSHAW 67 HBC	+ C 3.5 K+ P (K PI)		11/67
W	B	SEEN IN (K PI) MODE OF 4-BODY FINAL STATE, FROM WORK OF BISHOP.						

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED

26 KA (128C) PARTIAL DECAY MODES

```
P1         KA INTC K*(890) PI                                  L18S08
P2         KA INTC K RHO                                       S11U09
P3         KA INTC K OMEGA                                     S11U01
P4         KA INTC K PI                                        S10S 8
P5         KA INTC K ETA                                       S10S14
```

26 KA (128C) BRANCHING RATIOS

```
R1  *      KA(128C) INTC (K PI) / (K*(890) PI)
R1  S        0.8     CR LESS          SHEN       66 HBC                    11/67
R1  S    SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATED WITH KA(1320).
```

REFERENCES FOR KA(1280)

```
SHEN     66 PRL  17  726       +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
  ALSO SHEN  BERKELEY CONF     +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
BASSOMPI 67  PREPRINT TO PL    BASSOMPIERRE,GOLDSCHMIDT+ //CERN+BRUX+BIRM IJP
CRENNELL 67 PRL 19  44         +KALBFLEISCH,LAI,SCARR,SCHLMANN ////// BNL I
GOLDHABER67 PRL 19  972        G.GOLDHABER,FIRESTONE,SHEN            // LRL
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG /////////////// WISC
SEE ALSO 66 PRL  16  1069      BISHOP,GOSHAW,ERWIN,THOMPSON,WALKER+//WISC
```

$K_A(1320)$ 21 KA (132C,JP=) I=1/2

(JP = 1+ FAVORED)

SEE NOTE PRECEDING KA(120C-135C)

21 KA (132C) MASS (MEV)

```
M       12 1320.0      25.0          ALMEIDA   65 HBC  +   3-5 K+  P
M       70 1320.0      10.0          SHEN      66 HBC  +   4.6 K+  P
M          1320.0      15.0          BASSOMPIE 67 HBC  +   5. K+ P          11/67
M          1330.0                    BRITISH   67 HBC  +  10.0 K+ F          10/67
M          1360.0      10.0          GOLDHABER 67 HBC      9.0 K+ P          10/67
M          1320.0                    MARECHAL  67 HBC      0. PBAR P          9/67
M  S       1280.0                    SHEN      66 HBC  + C 4.6 K+P          11/67
M  S    SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATED WITH KA(1260).
M  N    45 1300.                     CRENNELL  67 HBC    C 6 PI- P            7/67
M  N       1300.       10.          GOSHAW    67 HBC    C 3.5 K+ F           7/67
M  N    THESE PEAKS MAY POSSIBLY BE ASSOCIATED WITH THE KA(1260).
M  B       1310.       10.          GOSHAW    67 HBC  + 0 3.5 K+ F (K PI) 11/67
M  B    SEEN IN (K PI) MODE OF 4-BODY FINAL STATE, FROM WORK OF BISHOP.
M          . . . . . .
M  AVG     1335.3564  11.2317   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.8)
```

21 KA (132C) WIDTH (MEV)

```
W       12   60.0      20.0          ALMEIDA   65 HBC  +
W       70   80.0      20.0          SHEN      66 HBC  +
W            60.0      20.0          BASSOMPIE 67 HBC  +   5. K+ P          11/67
W            80.0      20.0          GOLDHABER 67 HBC      9.0 K+ P          10/67
W            60.0                    MARECHAL  67 HBC      0. PBAR P          9/67
W  S        100.0      20.0          SHEN      66 HBC  + C 4.6 K+ F          11/67
W  S    SEEN IN FIVE-BODY FINAL STATE. MAY BE ASSOCIATED WITH KA(1260).
W  N    45   60.                     CRENNELL  67 HBC    C 6 PI- P            7/67
W  N         40.       15.          GOSHAW    67 HBC    0 3.5 K+ F           7/67
W  N    THESE PEAKS MAY POSSIBLY BE ASSOCIATED WITH THE KA(1280).
W  B         40.       20.          GOSHAW    67 HBC  + C 3.5 K+ P (K PI) 11/67
W  B    SEEN IN (K PI) MODE OF 4-BODY FINAL STATE, FROM WORK OF BISHOP.
W          . . . . . .
W  AVG      70.0000  10.0000   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
```

21 KA (132C) PARTIAL DECAY MODES

```
P2         KA INTC K RHO                                       S11L09
P3         KA INTC K OMEGA                                     S11U01
P4         KA INTC K PI                                        S10S 8
P5         KA INTC K ETA                                       S10S14
P1         KA INTC K*(890) PI                                  L18S08
```

21 KA (132C) BRANCHING RATIOS

```
R1  *      KA INTC K*(890) PI AND K RHO (OVERLAPPING BANDS)
R1      70   1.0                      SHEN      66 HBC  +

R2  *      KA INTC(K OMEGA)/(K*(890) PI)                       (P3)/(P1)
R2           0.1   OR LESS           SHEN      66 HBC  +
R2         . . . . . .
R2  FIT        .065     .066    VALUE FROM CONSTRAINED FIT
```

```
R3  *      KA (1320) INTO (K*(890) PI)/ TOTAL                  (P1)/TOTAL
R3           0.92     0.02     0.2C  GOSHAW    67 HBC  (ASS. NO K PI MODE)  7/67
R3  C        0.46     0.11           GOSHAW    67 HBC  (IF K PI MODE EX.)   7/67
R3         . . . . . .
R3  FIT        .920     .110    VALUE FROM CONSTRAINED FIT

R4  *      KA(1320) INTC (K PI) / TOTAL                        (P4)/TOTAL
R4  C        0.51     0.11           GOSHAW    67 HBC  +                    7/67

R5  *      KA (1320) INTO (K RHO) / TOTAL                      (P2)/TOTAL
R5  G        0.06     0.06           BISHOP    66 HBC
R5  G    LATER PAPER BY GOSHAW+67 DOES NOT OBSERVE K RHO MODE BUT DOES NOT    7/67
R5  G    GIVE A LIMITING VALUE ON THE BRANCHING RATIO.                        7/67

R6  *      KA (1320) INTO (K ETA) / TOTAL                      (P5)/TOTAL
R6           0.00     0.12           GOSHAW    67 HBC  +                    7/67

R7  *      KA (1320) INTO ( K OMEGA ) / TOTAL                  (P3)/TOTAL
R7           0.06     0.06           GOSHAW    67 HBC  +                    7/67
R7         . . . . . .
R7  FIT        .060     .060    VALUE FROM CONSTRAINED FIT

R8  *      KA (1320) INTO (K PI) / (K*(890) PI)                (P4)/(P1)
R8           0.30   OR LESS          SHEN      66 HBC  +

R9  *      KA (1320) INTO (K+ PI-) / (K+0 PI0+ PI-)
R9           0.2    CR LESS (CL=.90)  CRENNELL  67 HBC    0                  7/67

R10 *      KA (1320) INTO (K0 PI+ PI- PI0) / (K+0 PI0+ PI-)
R10          0.1    CR LESS (CL=.90)  CRENNELL  67 HBC    C                  7/67

R   C   EXISTENCE OF K PI MODE IS CONTROVERSIAL. SEE GOSHAW+67.              7/67
R   *FOR 1+ NONET SU3 RATES SEE E.G. GOLDHABER, REVIEW BERKELEY CONF.1966
```

REFERENCES FOR KA(1320)

```
ALMEIDA  65 PL 16 184          ALMEIDA,ATHERTON,BYER,DORMAN,FORSON+/CAMBR
BISHOP   66 PRL  16  1069      BISHOP,GOSHAW,ERWIN,THOMPSON,WALKER+//WISC
SHEN     66 PRL  17  726       +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
  ALSO SHEN  BERKELEY CONF     +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL

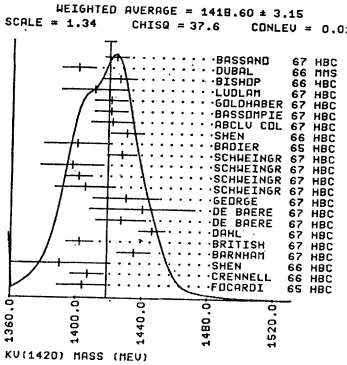
BASSOMPI 67  PREPRINT TO PL    BASSOMPIERRE,GOLDSCHMIDT+ //CERN+BRUX+BIRM IJP
BRITISH  67  HEIDELBERG CONF             // BIRMINGHAM+GLASGOW+CAFORC
CRENNELL 67 PRL 19  44         +KALBFLEISCH,LAI,SCARR,SCHLMANN ////// BNL I
GOLDHABER67 PRL 19  972        G.GOLDHABER,FIRESTONE,SHEN            // LRL
GOSHAW   67  PREPRINT          +ERWIN+WALKER+WEINBERG /////////////// WISC
   SEE ALSO BISHOP 66 ABOVE
MARECHAL 67  HEIDELBERG CONF. +BARLOW,F.JAMES+//CERN+CCF+IPN.PARIS+LPCOL
```

$K_V(1420)$ 22 KV (142C,JP=2+) I=1/2

JP = 3- IS UNLIKELY BUT NOT YET COMPLETELY RULED OUT.

22 KV(1420) MASS (MEV)

```
M          1404.0      15.0          FOCARDI   65 HBC   -C 3.  K- P (K PI)
M       35 1407.0      10.0          CRENNELL  66 HBC    C 6. PI- P (K PI)
M          1390.0      30.0          SHEN      66 HBC  + C 4.6 K+ P (K PI)
M          1435.0      10.0          BARNHAM   67 HBC  +  10.0 K+ P (K PI) 11/67
M          1402.0       8.0          BRITISH   67 HBC   -C 3.5 K- P (K PI) 11/67
M          1446.0       7.9          DAHL      67 HBC    C 4.PI- P (KPI)
M          1427.       15.0          DE BAERE  67 HBC  +  3.5 K+P (KO PI+)
M          1440.       24.0     40.  DE BAERE  67 HBC  +  3.5 K+P (K+ PIC)
M          1430.0      20.0          GEORGE    67 HBC    C 5.  K+ P (K PI)
M          1405.0      18.0          SCHWEINGR 67 HBC    C 4.1 K- P (K PI)  9/67
M          1401.0       8.0          SCHWEINGR 67 HBC   -  4.1 K- P (K PI)  9/67
M          1397.0      19.0          SCHWEINGR 67 HBC    C 5.5 K- P (K PI)  9/67
M          1427.0       9.0          SCHWEINGR 67 HBC   -  5.5 K- P (K PI)  9/67
M          1400.0      20.0          BADIER    65 HBC   -  3.  K- P (K*PI)
M          1430.0                    BRITISH   66 HBC    C 6.  K- P (K*PI)
M          1430.0      10.0          SHEN      66 HBC  + C 4.6 K+ P (K*PI)
M          1421.0      13.0          ABCLV CCL 67 HBC     10.1 K- P          10/67
M          1420.0      10.0          BASSOMPIE 67 HBC  +   5. K+ P (K 2PI) 11/67
M          1440.                     CRENNELL  67 HBC    C 6 PI- P (K 2PI)  7/67
M          1420.0      10.0          GOLDHABER 67 HBC      9.0 K+ P(K 2PI) 10/67
M          1410.0      20.0          LUDLAM    67 HBC     12.6 K-P            9/67
M  *    THE FOLLOWING VALUES ARE FROM BOTH (K PI) AND (K 2PI) MODES
M          1425.0      10.0          BISHOP    66 HBC  +   3.5 K+ P
M          1400.0      10.0          DUBAL     66 MMS   -  7-12 K- P
M          1423.0       7.0          BASSANO   67 HBC  -C 4.6, 5.C K- P   10/67
M          . . . . . .
M  AVG     1418.6034   3.1504   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                        (SEE IDEOGRAM)
```



MESON RESONANCES

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

22 KV(1420) WIDTH (MEV)

```
W            92.0     14.0              FOCARDI   65 HBC   -C 3.0 K- P (K PI)
W       35   70.      30.       15.     CRENNELL  66 HBC    C 6.0 PI-P
W            75.0     25.0              SHEN      66 HBC     4.6 K+ P
W            75.0     25.0              BARNHAM   67 HBC  +  10.0 K+ P (K PI) 11/67
W           140.0     20.0              BRITISH   67 HBC   -C 3.5 K- P (K PI) 11/67
W            61.0     24.0              DAHL      67 HBC    C 3.8-4.2 PI- P
W            90.0     28.0              DE BAERE  67 HBC  +   3.5 K+ P
W           110.0     40.0              GEORGE    67 HBC    C 5.0 K+ P
W           107.0     20.0              SCHWEINGR 67 HBC   -C 4.1+5.5 K-P       9/67
W           105.0     30.0              BADIER    65 HBC
W           145.0     33.0              ABCLV CCL 67 HBC     10.1 K- P          10/67
W            80.0     20.0              BASSOMPIE 67 HBC  +   5. K+ P (K+ PI) 11/67
W            80.0     20.0              GOLDHABER 67 HBC     9.0 K+ P(K 2PI) 10/67
W            90.0     20.0              LUDLAM    67 HBC     12.6 K-P            9/67
W            96.0     10.0              BISHOP    66 HBC  +   3.5 K+ P
W            62.0     16.0              DUBAL     66 MMS  -   7-12 K- P
W            65.0     20.0              BASSANO   67 HBC   -C 4.6, 5.C K- P    10/67
W
W   AVG      89.0557   5.1029   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.1)
                    (SEE IDEOGRAM)
```

22 KV (142C) PARTIAL DECAY MODES

```
P1          KV(142C) INTO K PI                                  S10S 8
P2          KV(1420) INTO K*(89C) PI                            L18S 8
P3          KV(1420) INTO K RHO                                 S10U 9
P4          KV(142C) INTO K OMEGA                               S1CU 1
P5          KV(1420) INTO K ETA                                 S1CS14
```

U22 KV(1420) BRANCHING RATICS

```
R1  *    KV(1420) INTO (K PI)/TCTAL                             (P1)/TOTAL
R1  R          0.37     0.19          BADIER    65 HBC
R1  R          0.33     0.07          BISHOP    66 HBC
R1  R          0.39     0.11          BASSANO   67 HBC   -  4.6, 5.C K- P    10/67
R1  R          0.62     0.09          BRITISH   67 HBC   -C 3.5 K- P         11/67
R1  R    THIS BRANCHING RATIO CONTAINS REDUNDANT INFORMATION, SINCE WE
R1  R    CONSTRAIN THE SUM OF ALL BRANCHING RATICS TO BE 1.C
R1            . . . . . .
R1  FIT        .065     .066     VALLE FROM CONSTRAINED FIT

R2  *    KV(1420) INTO (K*(89C) PI) / TOTAL                     (P2)/TOTAL
R2            0.41     0.14          BADIER    65 HBC
R2            0.56     0.10          BISHOP    66 HBC
R2            0.47     0.10          BASSANO   67 HBC   -  4.6, 5.C K- P    10/67
R2            0.26     0.06          BRITISH   67 HBC   -C 3.5 K- P         11/67
R2          . . . . . .
R2  AVG        .3709    .0712   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.6)
R2  FIT        .327     .C26    VALLE FROM CONSTRAINED FIT

R3  *    KV(1420) INTO (K RHO)/TOTAL                            (P3)/TOTAL
R3            0.14     0.C5          BADIER    65 HBC
R3            0.10     0.05          BISHOP    66 HBC
R3            0.14     C.10          BASSANO   67 HBC    C 4.6, 5.C K- P    10/67
R3            0.05  CR LESS          BRITISH   67 HBC   -C 3.5 K- P         11/67
R3          . . . . . .
R3  AVG        .1222    .0333   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R3  FIT        .119     .030    VALLE FROM CONSTRAINED FIT

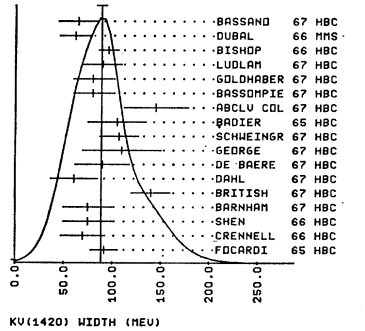
R4  *    KV(1420) INTO (K OMEGA)/TCTAL                          (P4)/TOTAL
R4            0.07     0.04          BADIER    65 HBC
R4            0.08     0.05          BRITISH   67 HBC   -0 3.5 K- P         11/67
R4            0.03  CR LESS          LEITNER   67 HBC   -  4.6,5 K- P        9/67
R4          . . . . . .
R4  AVG        .0739    .0312   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R4  FIT        .024     .009    VALLE FROM CONSTRAINED FIT

R5  *    KV(1420) INTO (K ETA)/TOTAL                            (P5)/TOTAL
R5            0.02     0.02          BADIER    65 HBC
R5            0.03  CR LESS          BRITISH   67 HBC   -C 3.5 K- P         11/67
R5            0.03  CR LESS          LEITNER   67 HBC   -  4.6,5 K- P        9/67
R5          . . . . . .
R5  FIT        .021     .C10    VALLE FROM CONSTRAINED FIT

R6  *    KV(1420) INTO (K*(890) PI) / (K PI)                    (P2)/(P1)
R6       6     0.33     0.33          CHUNG     65 HBC  + C  3.9-4.2 PI- P
R6             0.65     0.20          SHEN      66 HBC     C  N* PRCDUCED
R6             0.43     0.20          SHEN      66 HBC  +     NO N* PRODUCED
R6             0.62     0.11          SCHWEINGR 67 HBC     0 4.1+5.5 K- P     10/67
R6          . . . . . .
R6  AVG        .6083    .0840   AVERAGE (ERROR INCLUDES SCALE FACTCR = 1.C)
R6  FIT        .643     .076    VALLE FROM CONSTRAINED FIT

R7  *    KV(1420) INTO (K OMEGA) / K PI                         (P4)/(P1)
R7  *          0.08  CR LESS          SHEN      66 HBC
R7       4     0.02     0.024         GOSHAW    67 HBC     3.5 K+ P           7/67
R7          . . . . . .
R7  FIT        .047     .C18    VALLE FROM CONSTRAINED FIT
```

WEIGHTED AVERAGE = 89.06 ± 5.10
SCALE = 1.08 CHISQ = 18.7 CONLEV = 0.285



KV(1420) WIDTH (MEV)

```
R8  *    KV(1420) INTO (K RHO) / (K PI)                         (P3)/(P1)
R8  *          0.09  CR LESS          CHUNG     65 HBC  + C  3.9-4.2 PI- P
R8             0.31     0.16          SCHWEINGR 67 HBC     C 4.1+5.5 K- P     10/67
R8          . . . . . .
R8  FIT        .233     .068    VALLE FROM CONSTRAINED FIT

R9  *    KV(1420) INTO (K RHO) / (K*(89C) PI)                   (P3)/(P2)
R9  *          0.39  CR LESS          BASSOMPIE 67 HBC  +   5. K+ P           9/67
R9  *          0.40  CR LESS  (CL=.9C) FIELD     67 HBC  -   3.8 K- P        6/67

R10 *    KV(1420) INTO (K OMEGA) / (K*(890) PI)                 (P4)/(P2)
R10            0.1C     0.04          FIELD     67 HBC  -   3.8 K- P        6/67
R10         . . . . . .
R10 FIT        .073     .030    VALLE FROM CONSTRAINED FIT

R11 *    KV(1420) INTO (K ETA) / (K*(89C) PI)                   (P5)/(P2)
R11            0.07     0.04          FIELD     67 HBC  -   3.8 K- P        6/67
R11         . . . . . .
R11 FIT        .066     .032    VALLE FROM CONSTRAINED FIT

R12 *    KV(1420) INTO (K ETA) / (K PI)                         (P5)/(P1)
R12      2     0.05     0.06          GOSHAW    67 HBC     3.5 K+ P           7/67
R12         . . . . . .
R12 FIT        .042     .020    VALLE FROM CONSTRAINED FIT

R   *FOR 2+ NONET SU3 RATES SEE E.G. GLASHOW,SCCOLOW, PRL 15,329(65)
```

REFERENCES FOR KV(1420)

```
BADIER    65 PL 19 612        BADIER,CEMOLLIN,GOLDBERG+//EP+SACLY+ZEEMAN
CHUNG     65 PRL  15  325     +CAHL,HARCY,HESS,JACOBS,KIRZ,MILLER // LRL
FOCARDI   65 PL 16 351        FCCARCI,MINGUZZI RANZI,SERRA+ /BOLOGNA+CEN

BISHOP    66 PRL 16 1069      BISHOP,GOSHAW,ERWIN,THOMPSON+ // WISCONSIN
BRITISH   66  BERKELEY CONF.  BIRM+GLASGOW+LONDCN(IC)+MANCH+CXFORD+RUTH
CRENNELL 66  BERKELEY CONF    +KALBFLEISCH,LAI,SCARR,SCHLMANN+/////, BNL  IJP
DUBAL     66  BERKELEY CONF   CERN MISSING MASS SPECTROMETER GROUP//CERN
SHEN      66  BERKELEY CONF   +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
ALSC SHEN66 PRL  17  726      +BUTTERWORTH,FU,GOLDHABERS,TRILLING // LRL
    ALSC 66  (PRIVATE COMMUN)GERSON GOLDHABER                  /// LRL

ABCLV CC 67  HEIDELBERG CONF. AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
SEE ALSC 66 PL 22 357         BARTSCH,DEUTSCHMANN,MORRISON+ // ABCL(IC)V
BARNHAM   67  HEIDELBERG CONF +BRANEY,HUGHES,KOHLER+ // BIRM+GLASGOW+CXF
BASSANO   67 PRL  19  968     +GOLDBERG,GOZ,BARNES,LEITNER+/BNL+SYRACUSE
BASSOMPI 67  PREPRINT TO PL   BASSOMPIERRE,GOLDSCHMIDT+ //CERN+BRUX+BIRM IJP
BRITISH   67  PREPRINT        BIRM-GLASGOW-LONDON(IC)-CXFORD-RUTH CCLLAB IJP
CRENNELL 67 PRL 19  44        +KALBFLEISCH,LAI,SCARR,SCHLMANN ////// BNL
DAHL      67  UCRL-16578      +HARCY+HESS+KIRZ+MILLER ////////////// LRL
SEE ALSC 65 PRL 14 401        HARCY,CHUNG,DAHL,HESS,KIRZ,MILLER //// LRL
DE BAERE 67 NC 51 A 401       +GOLDSCHMIDT-CLERMONT,HENRI+ /// BRUX+CERN
FIELD     67 PL 24B 638       +HENDRICKS+PICCIONI+YAGER //////// LAJOLLA
GEORGE    67 NC 49A 9         +GOLDSCHMIDT-CLERMONT+HENRI+ /// CERN+BRUX
GOLDHABER67 PRL 19  972       G.GOLDHABER,FIRESTONE,SHEN              // LRL
GOSHAW    67  PREPRINT        +ERWIN+WALKER+WEINBERG ////////////// WISC
LEITNER   67  PRIVATE COMMUN.                                      SYR+BNL
LUDLAM    67  HEIDELBERG CONF. +LACH,SANDWEISS,TAFT                 // YALE
SCHWEING 67  PREPRINT TO PR   SCHWEINGRUBER,DERRICK,FIELDS,AMMAR+/ANL+NW
```

K(1660)

27 KV (166C, JP=) I = 1/2

EVIDENCE NOT COMPELLING, OMITTED FROM TABLE

27 KV (1660) MASS (MEV)

```
M          1660.0                 CARMONY   67 HBC   -  3.8 K-P,OMEGA K 11/67
M          1660.0     10.0        JOBES     67 HBC   +  5. K+ P           11/67
M    J  CLAIMED BY JOBES IN (K PI), (K*(890) PI), AND (K*(1420) PI) MODES.  11/67
M    J  JOBES 67 SEES THE K PI BUMP MOSTLY IN INTERFERENCE WITH N*(1236).   11/67
```

27 KV (166C) WIDTH (MEV)

```
W           60.0     2C.0           JOBES     67 HBC   +  5. K+ P           11/67
```

27 KV (166C) PARTIAL DECAY MODES

```
P1     KV*(1660) INTO K PI                                  S10S 8
P2     KV*(1660) INTO K PI PI                               S10S 8S 8
P3     KV*(1660) INTO K*(89C) PI                            L18S 8
P4     KV*(1660) INTO KV*(1430) PI                          L22S 8
```

REFERENCES FOR KV(1660)

```
CARMONY   67 PRL  18  615     D.CARMONY,T.HENDRICKS,L.LANCER // LA JOLLA
JOBES     67  PREPRINT TO PL  +BASSOMPIERRE,DE BAERE + // BIRM+CERN+BRUX
```

K_A(1800)

23 KA (1800, JP=) I = 1/2

(ALSC CALLED L MESON)
(JP = 1+, 2- SEEM MOST LIKELY)

L23 KA (18CC) MASS (MEV)

```
M          179C.C     1C.C           ABCLV CCL 67 HBC   -  1C.C K- P         1C/67
M          178C.C                    BARNHAM   67 HBC   +  1C. K+P(K PI PI) 11/67
M       2C 176C.                     BERLINGHI 67 HBC   +                     7/67
M          174C.C                    FIRESTONE 67 HBC   +  5. K+ P 1C P+PP  11/67
M          176C.C     15.C           JOBES     67 HBC   +  5. K+ P          11/67
M          . . . . . .
M   AVG    1760.7692 13.8462   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.7)
```

L23 KA (18CC) WIDTH (MEV)

```
W          12C.C     4C.C           ABCLV CCL 67 HBC   -  1C.C K- P         1C/67
W          2CC.C                    BARNHAM   67 HBC   +  1C. K+P(K PI PI) 11/67
W       2C  8C.                     BERLINGHI 67 HBC   +                     7/67
W          12C.C                    FIRESTONE 67 HBC   +  5. K+ P 1C P+PP  11/67
W          6C.C      2C.C           JOBES     67 HBC   +  5. K+ P          11/67
W          . . . . . .
W   AVG    72.CCOC  24.CCCC   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
```

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

L23 KA (1800) PARTIAL DECAY MODES

P1	KA	INTO K PI	S11S 9
P2	KA	INTO K RHO	S11U 9
P3	KA	INTO K*(890) PI	S 9U18
P4	KA	INTO K OMEGA	S11U 1
P5	KA	INTO K PI PI	S11S 9S 9
P6	KA	INTO K*(1420) PI	S 9L22
P7	KA	INTO K ETA	S11S14

L23 KA (1800) BRANCHING RATIOS

R1	*	KA	INTO (K PI)/TOTAL		(P1)/TOTAL	
R1			0.023 CR LESS	ABCLV CCL 67 PBC	- 10.0 K- P	10/67
R2	*	KA	INTO (K RHO)/TOTAL			
R2			0.059 0.06	ABCLV CCL 67 PBC	- 10.0 K- P	10/67
R3	*	KA	INTO (K*(890) PI)/TOTAL			
R3			0.244 0.06	ABCLV CCL 67 PBC	- 10.0 K- P	10/67
R4	*	KA	INTO (K OMEGA)/TOTAL			
R4			0.048 0.02	ABCLV CCL 67 PBC	- 10.0 K- P	10/67
R6	*	KA	INTO (K PI PI)/(TOTAL)		(P5)/TOTAL	
R6			0.445 0.15	ABCLV CCL 67 PBC	- 10.0 K- P	10/67
R7	*	KA	INTO (K*(1420) PI) / TOTAL		(P6)/TOTAL	
R7			0.164 0.08	ABCLV CCL 67 PBC	- 10.0 K- P	10/67
R8	*	KA	INTO (K ETA)/TOTAL		(P7)/TOTAL	
R8			0.01 CR LESS	ABCLV CCL 67 PBC	- 10.0 K- P	10/67

REFERENCES FOR KA(1800)

ABCLV CC 67	HEIDELBERG CONF.	AACHEN+BERLIN+CERN+LONDON IC+VIENNA CCLLAB
SEE ALSO 66	PL 22 357	BARTSCH,DEUTSCHMANN,MORRISON+ // ABCL(IC)V
BARNHAM 67	HEIDELBERG CONF	+BEANEY,HUGHES,ECKLER+ // BIRM+GLASGOW+OXF
BERLINGH 67	PRL 18 1087	BERLINGHIERI+FARBER+FERBEL+FORMAN+ // RCCH I
FIRESTON 67	HEIDELBERG CONF	A.FIRESTONE,G.GOLDHABER,E.SHEN // LRL
JOBES 67	PREPRINT TO PL	+BASSOMPIERRE,DE BAERE + // BIRM+CERN+BRUX

DATA ON BARYON RESONANCES

CODE EVENTS QUANTITY ERROR+ ERROR- REFERENCE YR TECN SIGN COMMENTS CATE
ABOVE PUNCHED
BACKGROUND

p

1o PROTON (938, J=1/2) I=1/2

SEE LISTINGS OF STABLE PARTICLES

n

1/ NEUTRON (939, J=1/2) I=1/2

SEE LISTINGS OF STABLE PARTICLES

Δ(1236)

81 N*3/2(1236, JP=3/2+) I=3/2 $P_{3,3}$

61 N*3/2(1236) MASS (MEV)

M	*	1234.0		ROPER	65 RVUE	C++PHASE-SHIFT ANAL	
M++		1236.0	0.55	OLSSON	65 RVUE	++ TOTAL-SIGMA DATA	
M++	*	1232.0	6.0	FERRO-LUZ	65 PBC	++ K+P TO K0 P PI+	
M++	*	1233.4	4.4	GIDAL	66 DBC	++ D D TO NN(NN) PI	
M++		1236.0		DEANS	66 RVUE	++ PI+P TOTAL	
M	*	1235.6		LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
MO		1236.45	0.65	OLSSON	65 RVUE	C	
M-	*	1241.3	5.1	GIDAL	66 DBC	-	

61 N*(0) - N*(++) MASS DIFFERENCE (MEV)

D	R	0.45	0.65	OLSSON	65 RVUE
D	R	REDUNDANT WITH DATA IN MASS LISTING.			

61 N*(-) - N*(++) MASS DIFFERENCE (MEV)

D	7.9	6.8	GIDAL	66 DBC

61 N*3/2(1236) WIDTH (MEV)

W++	120.0	2.0	OLSSON	65 RVUE	++
W++ *	125.0	30.0	FERRO-LUZ	65 HBC	++
W++ *	124.0	14.0	GIDAL	66 DBC	++
W++	121.0		DEANS	66 RVUE	++
WO	119.6	2.4	OLSSON	65 RVUE	0
W- *	149.0	16.0	GIDAL	66 DBC	-
W	125.1		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67

81 N*3/2(1236) PARTIAL DECAY MODES

P1	N*3/2(1236) INTO PI N		S 8S16

REFERENCES -- N*3/2(1236)

OLSSON 65	PRL 14 116	M G OLSSON	//WISC
FERRO-LU 65	NC 36 1101	FERRO-LUZZI,GEORGE, +	//CERN
ROPER 65	PR 138 B130	L D ROPER, R M WRIGHT, d T FELD //LRL,MIT JP	
GIDAL 66	PR 141 1261	G GIDAL, A KERNAN, S KIM	//LRL
DEANS 66	PREPRINT	S R DEANS, W G HOLLADAY	//VANDERBILT
LOVELACE 67	HEIDELBERG CONF. SEE ALSO --	C LOVELACE	//CERN IJP
DONNACHI 67	PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

FOR EXTENSIVE REFERENCES TO DATA AND PHASE-SHIFT ANALYSES TILL 1965, SEE ROPER 65, ESPECIALLY APPENDIX II.

N(1470)

81 N*1/2(1470, JP=1/2+) I=1/2 $P_{1,1}$

WHETHER THE BUMP NEAR 1400 MEV SEEN IN INELASTIC PP SCATTERING IS A RESONANCE OR A KINEMATIC EFFECT IS A SUBJECT OF DEBATE. SEE GELLERT 66 FOR THE VIEW THAT IT IS A KINEMATIC EFFECT -- SEE ALMEIDA 66 FOR THE OPPOSITE VIEW. WE LIST BUT STAR RESULTS OF PP SCATTERING EXPERIMENTS. PHASE-SHIFT ANALYSES APPEAR TO GIVE BETTER EVIDENCE FOR A RESONANCE IN THIS REGION.
THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT.
OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1510) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

61 N*1/2(1470) MASS (MEV)

M	*	1400.0	APPROX	COCCONI	64 CNTR	+ PP 3.6-12 BEV/C	
M	*	1425.0	APPROX	ADELMAN	64 HBC	+ K-P 1.45 BEV/C	
M	*	1430.0	APPROX	ANKENBRAN	65 CNTR	+ PP 7.1 BEV/C	
M	*	1400.0	APPROX	BELLETTIN	65 SPAK	+ PP,D 10-26 BEV/C	
M	*	1405.0	15.0	ANDERSON	66 SPAK	+ PP 6-30 BEV/C	
M	*	1410.0	15.0	BLAIR	66 CNTR	+ PP 2.8-7.9 BEV/C	
M	*	1450.0	15.0	ALMEIDA	67 HBC	+ PP 2PI 10 BEV/C	
M	*	1380.0		ROPER	65 RVUE	PHASE-SHIFT ANAL	
M	*	1400.0	30.0	FOLEY	67 CNTR	PI+- P AND PP	11/67
M	*	1370.0		BRANDSEN	65 RVUE	PHASE-SHIFT ANAL	
M	1	1470.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
	1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.					
M	2	1505.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
	2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM					
	2	IS GREATEST.					
M		1466.0		LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
		WHERE THE ABSORPTION IS GREATEST.					
		SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.					

61 N*1/2(1470) WIDTH (MEV)

W	1	255.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
W	2	205.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
W		211.0		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				

61 N*1/2(1470) PARTIAL DECAY MODES

P1	N*1/2(1470) INTO PI N		S 8S16
P2	N*1/2(1470) INTO N SIGMA (SIGMA MESON)		S16U 7
P3	N*1/2(1470) INTO N*3/2(1236) PI		U8IS 8

61 N*1/2(1470) BRANCHING RATIOS

R1		N*1/2(1470) INTO (PI N)/TOTAL			(P1)/TOTAL	
R1	1	0.66		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
R1		0.658		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				
R2		N*1/2(1470) INTO (N SIGMA)/TOTAL			(P2)/TOTAL	
R2		DOMINANT INELASTIC DECAY		THURNAUER	65 RVUE	- 11/67
R2		DOMINANT INELASTIC DECAY		NAMYSLOWS	66 RVUE	- 11/67
R2		DOMINANT INELASTIC DECAY		MORGAN	67 RVUE	- 11/67
R2		DOMINANT INELASTIC DECAY		ROSENFELD	67 RVUE	- 11/67

REFERENCES -- N*1/2(1470)

COCCONI 64	PL 8 134	+LILLETHUN,SCANLON,STAHLBRANDT, + //CERN	
ADELMAN 64	PRL 13 555	S L ADELMAN	//CAMBRIDGE(CERN)
ANKENBRA 65	NC 35 1052	ANKENBRANDT,CLYDE,CORK,KEEFE,KERTH,+ //LRL	
BELLETTI 65	PL 18 167	BELLETTINI,COCCONI,DIDDENS, + //CERN	
ANDERSON 66	PRL 16 855	+BLESER,COLLINS,FUJII, + //BNL,CARNEGIE	
BLAIR 66	PRL 17 789	+TAYLOR,CHAPMAN,+//HARWELL,QUEENMARY,RTHFD	
GELLERT 66	PRL 17 884	+SMITH,WOJCICKI,COLTON,SCHLEIN,+//LRL,UCLA	
ALMEIDA 67	NC 50A 1000	+RUSHBROOKE, + //CAVNDSH,HAMBURG	
FOLEY 67	PRL 19 397	+JONES,LINDENBAUM,LOVE,OZAKI, + //BNL	
ROPER 65	PR 138 B130	L D ROPER,RM WRIGHT,dT FELD //LRL-LVMA,MIT IJP	
BRANDSEN 65	PR 139 B1566	+DONNELL, MOORHOUSE / //DURHAM,RTHFD IJP	
THURNAUE 65	PRL 14 985	P G THURNAUER //ROCH	
NAMYSLOW 66	PR 157 1328	NAMYSLOWSKI,RAZMI,ROBERTS //STAN,EDINB,IC	
MORGAN 67	PREPRINT RPP/A27	D MORGAN //RTHFD	
ROSENFEL 67	IAWINE CONF	A H ROSENFELD, P SODING //LRL	
BAREYRE 67	PR (SUBMITTED)	P BAREYRE, C BRICMAN, G VILLET //SACLAY IJP	
LOVELACE 67	HEIDELBERG CONF. SEE ALSO --	C LOVELACE //CERN IJP	
DONNACHI 67	PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

PAPERS NOT REFERRED TO IN DATA CARDS.

BAREYRE 64	PL 8 137	+BRICMAN,VALLADAS,VILLET, + //SACLAY,CAEN IJ	
ADELMAN 65	PRL 14 1043	S L ADELMAN //CAMBRIDGE(CERN)	
DALITZ 65	PL 14 159	R H DALITZ, R G MOORHOUSE //OXF,RTHFD	
--	DALITZ 65 REVIEWS EARLY PHASE-SHIFT-ANALYSIS RESULTS (AND DISCUSSES WHETHER THEY IN FACT REQUIRE THE EXISTENCE OF A RESONANCE).		
BAREYRE 65	PL 18 342	+BRICMAN, STIRLING, VILLET //SACLAY IJP	
FRIDMAN 66	PL 23 386	+MAURER,MICHALON, + //STRASBOURG,HEIDEL	
	THE FOLLOWING ARE THEORETICAL PAPERS CONCERNING THE N*1/2(1470) --		
RESNICK 66	PR 150 1292	L RESNICK //NIELS BOHR	
SCHWARZ 66	PR 152 1325	J H SCHWARZ //LRL	
GOLDBERG 67	PR 154 1556	H GOLDBERG //CORNELL	
BALL 67	PR 155 1725	JS BALL, GL SHAW, DY WONG //UCLA,UCI,UCSD	

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

62 N*1/2(1518, JP=3/2-) I=1/2 $D_{1,3}$

N(1518)

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

62 N*1/2(1518) MASS (MEV)

M *	1536.0	ROPER	65 RVUE	PHASE-SHIFT ANAL	
M *	1530.0	BRANDSEN	65 RVUE	PHASE-SHIFT ANAL	
M 1	1510.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
M 1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.				
M 2	1515.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM				
2	IS GREATEST.				
M	1526.0	LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
	WHERE THE ABSORPTION IS GREATEST.				
	SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.				

62 N*1/2(1518) WIDTH (MEV)

W 1	125.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
W 2	110.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
W	114.0	LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
	THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				

62 N*1/2(1518) PARTIAL DECAY MODES

P1	N*1/2(1518) INTO PI N	S 8S16
P2	N*1/2(1518) INTO N*3/2(1236) PI	U8IS 8
P3	N*1/2(1518) INTO N PI PI	S16S 8S 8
P4	N*1/2(1516)+ INTO NEUTRON PI+	S17S 8
P5	N*1/2(1518)+ INTO PROTON PI+ PI-	S16S 8S 8
P6	N*1/2(1518) INTO N ETA	S17S14

62 N*1/2(1518) BRANCHING RATIOS

R1	N*1/2(1518) INTO (PI N)/TOTAL			(P1)/TOTAL	
R1 1	0.54	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
R1	0.570	LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
	THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				

ALMOST THE ENTIRE INELASTICITY IS IN N PI PI (ONLY N ETA COULD COMPETE, AND IT DOESN'T). THE N PI PI SEEMS TO BE MAINLY N*3/2(1236) PI, IN BOTH S AND D WAVES.

R2	N*1/2(1518) INTO (N*3/2(1236) PI)/TOTAL			(P4)/TOTAL	
R2	DOMINANT INEL DECAY	OLSSON	66 RVUE	PI P TO PI PI N	
R2	0.20 0.05	KIRZ	66 HBC	C ASSUMING R1=0.72	
R3	N*1/2(1518) INTO (N PI)/(N PI PI)			(P1)/(P3)	
R3	1.25 0.44 0.71	A-BORELLI 67 HBC		C P&AR P 5.7 BEV/C	
R4	N*1/2(1518) INTO (N*3/2(1236) PI)/(N PI PI)			(P2)/(P3)	
R4	0.00 0.09	A-BORELLI 67 HBC			
R4	LARGE	THURNAUER	65 RVUE	-	11/67
R4	LARGE	NAMYSLOWS	66 RVUE	-	11/67
R4	LARGE	MORGAN	67 RVUE	-	11/67
R4	LARGE	ROBERTS	67 RVUE	-	11/67
R4	LARGE	ROSENFELD	67 RVUE	-	11/67
R5	N*1/2(1518) INTO (NEUTRON PI+)/(P PI+ PI-)			(P4)/(P5)	
R5	0.77 0.45	ALEXANDER 67 HBC		+ PP 5.5 DEV/C	
R6	N*1/2(1518) INTO (PI N)/(PI N*3/2(1236))			(P1)/(P2)	
R6	0.42 OR LESS	LEE	67 HBC		11/67
R7	N*1/2(1518) INTO (N ETA)/TOTAL			(P6)/TOTAL	
R7	0.006 APPROX	DAVIES	66 RVUE		11/67

DAVIES 66 GIVES SEVERAL VALUES DEPENDING ON INPUT DATA. ALL ARE SMALL.

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REFERENCES -- N*1/2(1518)

SEE A PREVIOUS EDITION (RMP 37, 633, 1965) FOR EARLIER REFERENCES.

ROPER 65 PR 138 B190	LD ROPER,RM WRIGHT,BT FELD	//LRL-LVMR,MIT IJP
BRANDSEN 65 PR 139 B1566	+ODONNELL, MOORHOUSE	//DURHAM,RTHFD IJP
THURNAUE 65 PRL 14 965	P G THURNAUER	/ROCH
DAVIES 66 PREPRINT	A T DAVIES, R G MOORHOUSE	//GLASGOW,RTHFD
NAMYSLOW 66 PR 157 1326	NAMYSLOWSKI,RAZMI,ROBERTS	//STAN,EUINB,IC
KIRZ 66 PRIVATE COMM	J KIRZ	//LRL
-- NUMBER EXTRACTED FROM DATA DISCUSSED IN KIRZ 63.		
A-BORREL 67 NC 47 232	ALLES-BORELLI,FRENCH,FRISK,MICHEJDA	//CERN
ALEXANDE 67 PR 154 1284	ALEXANDER,BENARY,CZAPEK,+	//WEIZMANN(CERN)
LEE 67 PR 155 1156	+MOEBS,MOE,SINCLAIR,VANDER VELDE	//MICH
MORGAN 67 PREPRINT RPP/A27	D MORGAN	//RTHFD
ROBERTS 67 PREPRINT	R G ROBERTS	//DURHAM
ROSENFEL 67 IRVINE CONF	A H ROSENFELD, P SODING	//LRL
BAREYRE 67 PR (SUBMITTED)	P BAREYRE, C BRICMAN, G VILLET	//SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
SEE ALSO --		
DONNACHI 67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE	//CERN IJP

PAPERS NOT REFERRED TO IN DATA CARDS.

KIRZ 63 PR 130 2461	J KIRZ, J SCHWARTZ, R D TRIPP	//LRL
CROUCH 65 DESY CONF II 21	+ //BROWN,CEA,HARVARD,MIT,PADOVA,WEIZMANN	
DERADO 65 ATHENS CONF 244	+KENNEY,LAMSA, + //NOTRE DAME,KENTUCKY	
BAREYRE 65 PL 18 342	+ BRICMAN, STIRLING, VILLET	//SACLAY IJP
OLSSON 66 PR 145 1309	M G OLSSON, G B YODH	//WISC,MD
-- SUPERSEDED BY MORGAN 67.		
MERLO 66 P ROY SOC 289 469	J P MERLO, G VALLADAS	//SACLAY
-- THE ABOVE PAPERS DISCUSS INELASTIC CHANNELS NEAR THE RESONANCE.		

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63 N*1/2(1550, JP=1/2-) I=1/2 $S_{1,1}$

N(1550)

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

63 N*1/2(1550) MASS (MEV)

M *	1519.0	HENDRY	65 RVUE	ETA N + S11 PI N	
M	1570.0	MICHAEL	66 RVUE	FITS BAREYRE S11	
M N	1557.0 OR 1565.0	UCHIYAMA-	66 RVUE	FITS N ETA DATA	
M N	FITTING GIVES TWO SOLUTIONS. PROBLEMS MATCHING PI P PHASE SHIFTS.				
M 1	1535.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.				
M 2	1515.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM				
2	IS GREATEST.				
M	1546.0	LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
	WHERE THE ABSORPTION IS GREATEST.				
	SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.				

63 N*1/2(1550) WIDTH (MEV)

W *	130.0	HENDRY	65 RVUE		
W	130.0	MICHAEL	66 RVUE		
W N	150.0 OR 144.0	UCHIYAMA-	66 RVUE	SEE NOTE ON MASS	
W 1	155.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
W 2	105.0	BAREYRE	67 RVUE	PHASE-SHIFT ANAL	11/67
W	116.0	LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
	THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				

63 N*1/2(1550) PARTIAL DECAY MODES

P1	N*1/2(1550) INTO PI N	S 8S16
P2	N*1/2(1550) INTO N ETA	S17S14
P3	N*1/2(1550) INTO N PI PI	S16S 8S 8

63 N*1/2(1550) BRANCHING RATIOS

R1	N*1/2(1550) INTO (PI N)/TOTAL			(P1)/TOTAL	
R1 *	0.69	HENDRY	65 RVUE		
R1	0.31 OR 0.43	DAVIES	66 RVUE	SOLUT. B OR C	11/67
R1 *	0.32	MICHAEL	66 RVUE		
R1 N	0.71 OR 0.28	UCHIYAMA-	66 RVUE	SEE NOTE ON MASS	
R1	0.326	LOVELACE	67 RVUE	PHASE-SHIFT ANAL	11/67
R2	N*1/2(1550) INTO (N ETA)/TOTAL			(P2)/TOTAL	
R2	DOMINANT INEL DECAY	HENDRY	65 RVUE		
R2	0.69 OR 0.45	DAVIES	66 RVUE	SOLUT. B OR C	11/67
R2	0.68	MICHAEL	66 RVUE		
R2 N	0.29 OR 0.71	UCHIYAMA-	66 RVUE	SEE NOTE ON MASS	

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REFERENCES -- N*1/2(1550)

HENDRY 65 PL 18 171	A W HENDRY, R G MOORHOUSE	//RTHFD
-- REVIEWS EARLY PHASE-SHIFT-ANALYSIS RESULTS AND PI- P TO ETA N EXPERIMENTS. WE TAKE NUMBERS FROM THE SOLUTION USING BRANDSEN 65.		
BAREYRE 65 PL 18 342	+ BRICMAN, STIRLING, VILLET	//SACLAY IJP
DAVIES 66 PREPRINT	A T DAVIES, R G MOORHOUSE	//GLASGOW,RTHFD
MICHAEL 66 PL 21 93	C MICHAEL	//DXF
UCHIYAMA 66 PR 149 1220	F UCHIYAMA-CAMPBELL, R K LOGAN	//ILL IJP
BAREYRE 67 PR (SUBMITTED)	P BAREYRE, C BRICMAN, G VILLET	//SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
SEE ALSO --		
DONNACHI 67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE	//CERN IJP

PAPERS NOT REFERRED TO IN DATA CARDS.

BRANDSEN 65 PR 139 B1566	+ODONNELL, MOORHOUSE	//DURHAM,RTHFD IJP
-- BASIS OF NUMBERS WE QUOTE FROM HENDRY 65.		

THERE IS GETTING TO BE A WHOLE LITERATURE ON THE REACTIONS PI- P TO ETA N AND GAMMA P TO ETA P NEAR THRESHOLD AND THEIR CONNECTION WITH THE BEHAVIOR OF THE S11 AMPLITUDE AS DETERMINED IN PI P PHASE-SHIFT ANALYSIS. THE READER IS INVITED TO PERUSE THE FOLLOWING RATHER INDIGESTIBLE COLLECTION. FURTHER REFERENCES MAY BE FOUND IN THESE.

MAINLY EXPERIMENTAL --

BULOS 64 PRL 13 486	+ //BROWN,BRANDEIS,HARVARD,MIT,PADOVA	I
RICHARDS 66 PRL 16 1221	+CHIU,EANDI,HELMHOLZ,KENNEY,+ //LRL,HAWAII	IJ
JONES 66 PL 23 597	+BINNIE,DUANE,HORSEY,MASON,+//IMPCOL,RTHFD	
BACCI 66 NC 45A 983	+PENSO,SALVINI,MENCUCCINI,+//ROME,FRASCATI	IJP
PREPOST 67 PRL 18 82	R PREPOST, D LUNDQUIST, D QUINN //STANFORD	
MAINLY THEORETICAL --		
DOBSON 66 PR 146 1022	P N DOBSON	//HAWAII
MINAMI 66 PR 147 1123	S MINAMI	//OSAKA
BALL 66 PR 149 1191	J S BALL	//UCLA
LOGAN 67 PR 153 1634	R K LOGAN, F UCHIYAMA-CAMPBELL	//ILL
MENCUCCI 67 NC 48A 579	C MENCUCCINI, A REALE	//FRASCATI
DEANS 67 PR 161 1466	S R DEANS, W G HOLLADAY	//VANDERBILT
MINAMI 67 PR 162 1619	S MINAMI	//OSAKA

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Other possible N* resonances, as reported by Lovelace (1967 Heidelberg Conference). The values are certainly not significant to the number of places given.

	Wave	Mass (MeV)	Γ_{tot} (MeV)	Γ_{el}/Γ_{tot}
	P_{33}	1688	281	0.098
Probable	F_{35}	1913	350	0.163
resonances.[a]	P_{31}	1934	339	0.299
	D_{13}	2057	293	0.260
Resonance	D_{33}	1691	269	0.137
interpretation	P_{13}	~1863	~296	~0.207
in doubt.[b]	D_{35}	~1954	~311	~0.154
Unconfirmed	P_{11}	~1751	327	0.320
resonances.[c]	F_{17}	1983	225	0.128

[a] There is some evidence for these in at least two of the three phase-shift analyses (CERN, LRL, Saclay).

[b] All analyses see something, but a resonance interpretation is in doubt. Possible threshold effects.

[c] Seen in only one analysis. Doubtful.

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Δ(1640)

82 N*3/2(1640, JP=1/2-) I=3/2 $S_{3,1}$

82 N*3/2(1640) MASS (MEV)

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

M	*	1646.0	12.0	DEVLIN 65 CNTR	PI+- P TOTAL
M	1	1695.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.			
M	2	1650.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM			
	2	IS GREATEST.			
M		1635.0		LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		WHERE THE ABSORPTION IS GREATEST.			
		SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.			

82 N*3/2(1640) WIDTH (MEV)

W	1	250.0	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W	2	130.0	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W		177.0	LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.		

82 N*3/2(1640) PARTIAL DECAY MODES

P1	N*3/2(1640) INTO PI N	S 8S16

82 N*3/2(1640) BRANCHING RATIOS

R1		N*3/2(1640) INTO (PI N)/TOTAL		(P1)/TOTAL
R1		0.264	LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67

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REFERENCES -- N*3/2(1640)

DEVLIN 65 PRL 14 1031	T J DEVLIN,J SOLOMON,G BERTSCH //PRINCETON I	
BAREYRE 67 PR (SUBMITTED)	P BAREYRE, C BRICMAN, G VILLET	//SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
SEE ALSO --		
DONNACHI 67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

PAPERS NOT REFERRED TO IN DATA CARDS.

CARRUTHE 66 PRL 4 303	P CARRUTHERS	//CORNELL I
DEVLIN 62 PR 125 690	T J DEVLIN, B J MOYER, V PEREZ-MENDEZ//LRL I	
HELLAND 64 PR 134 B1062	+DEVLIN,HAGGE,LONGO,MOYER,WOOD	//LRL I
BAREYRE 65 PL 18 342	+ BRICMAN, STIRLING, VILLET	//SACLAY IJP

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N(1680)

64 N*1/2(1680, JP=5/2-) I=1/2 $D_{1,5}$

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

64 N*1/2(1680) MASS (MEV)

M	*	1674.0		DUKE 65 CNTR	PI+- P EL DSIG,P
M	*	1650.0	APPROX	BRANDSEN 65 RVUE	PHASE-SHIFT ANAL
M	1	1680.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.			
M	2	1655.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM			
	2	IS GREATEST.			
M		1678.0		LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		WHERE THE ABSORPTION IS GREATEST.			
		SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.			

64 N*1/2(1680) WIDTH (MEV)

W	1	135.0	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W	2	105.0	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W		173.0	LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.		

64 N*1/2(1680) PARTIAL DECAY MODES

P1	N*1/2(1680) INTO PI N	S 8S16
P2	N*1/2(1680) INTO N ETA	S17S14
P3	N*1/2(1680) INTO LAMBDA K	S18S11
P4	N*1/2(1680) INTO N*3/2(1236) PI	U61S 8

64 N*1/2(1680) BRANCHING RATIOS

R1		N*1/2(1680) INTO (PI N)/TOTAL		(P1)/TOTAL
R1	1	0.41	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
R1		0.391	LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.		
R2		N*1/2(1680) INTO (N ETA)/TOTAL		(P2)/TOTAL
R2		0.025 OR LESS	TRIPP 67 RVUE	8/67
R3		N*1/2(1680) INTO (LAMBDA K)/TOTAL		(P3)/TOTAL
R3		0.016 OR LESS	TRIPP 67 RVUE	8/67

SEE NOTE PRECEDING THE N*1/2(1688) INELASTIC DECAY MODE MEASUREMENTS.

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REFERENCES -- N*1/2(1680)

DUKE 65 PRL 15 468	+JONES,KEMP,MURPHY,PRENTICE, + //RTHFD,OXF IJP	
BRANDSEN 65 PL 19 420	+ODONNELL, MOORHOUSE	//DURHAM,RTHFD IJP
TRIPP 67 NP B3 10	+ LEITH, + //LRL,SLAC,CERN,HEIDEL,SACLAY	
BAREYRE 67 PR (SUBMITTED)	P BAREYRE, C BRICMAN, G VILLET	//SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
SEE ALSO --		
DONNACHI 67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

PAPER NOT REFERRED TO IN DATA CARDS.

BAREYRE 65 PL 18 342	+ BRICMAN, STIRLING, VILLET	//SACLAY IJP

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N(1688)

65 N*1/2(1688, JP=5/2+) I=1/2 $F_{1,5}$

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

65 N*1/2(1688) MASS (MEV)

M	*	1686.0	APPROX	DUKE 65 CNTR	PI+- P EL DSIG,P
M	*	1680.0		BRANDSEN 65 RVUE	PHASE SHIFT ANAL
M	1	1690.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.			
M	2	1680.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	2	WHERE THE VELOCITY OF THE AMPLITUDE ACRUSS THE ARGAND DIAGRAM			
	2	IS GREATEST.			
M		1692.0		LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		WHERE THE ABSORPTION IS GREATEST.			
		SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.			

65 N*1/2(1688) WIDTH (MEV)

W	1	110.0	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W	2	105.0	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W		132.0	LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.		

65 N*1/2(1688) PARTIAL DECAY MODES

P1	N*1/2(1688) INTO PI N	S 8S16
P2	N*1/2(1688) INTO N ETA	S17S14
P3	N*1/2(1688) INTO LAMBDA K	S18S11
P4	N*1/2(1688) INTO N*3/2(1236) PI	U61S 8
P5	N*1/2(1688) INTO N PI	S16S 8S 8
P6	N*1/2(1688)+ INTO NEUTRON PI+	S17S 8
P7	N*1/2(1688)+ INTO PROTON PI+ PI-	S16S 8S 8
P8	N*1/2(1688)+ INTO N*3/2(1236)++ PI-	U61S 8

65 N*1/2(1688) BRANCHING RATIOS

R1		N*1/2(1688) INTO (PI N)/TOTAL		(P1)/TOTAL
R1	1	0.64	BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
R1		0.683	LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.		

WE LIST MEASUREMENTS OF THE INELASTIC DECAY MODES OF THE 1688 MEV BUMP. SUCH MEASUREMENTS HAVE NOT UNTANGLED THE D15 AND F15 (AND POSSIBLE S11) COMPONENTS. IT IS CLEAR THAT BOTH D15 AND F15 DECAY ALOT INTO N PI PI. MERLO 66 FINDS SOME N*3/2(1236) PI (SLIGHTLY MORE THAN PHASE SPACE). ROBERTS 67 SUGGESTS THAT THE DOMINANT MODE IS N*1/2(1518).

R2		N*1/2(1688) INTO (N ETA)/TOTAL			(P2)/TOTAL
R2		0.025 OR LESS	KRAEMER	64 DBC +	PI+D 1.23 BEV/C
R2		0.042 OR LESS (95PC CL)	A-BORELLI	67 HBC +	PBAR P 5.7 BEV/C 8/67
R2		0.015	TRIPP	67 RVUE	8/67
R3		N*1/2(1688) INTO (N ETA)/(PI N)			(P2)/(P1)
R3		0.027 OR LESS	HEUSCH	66 RVUE +	PIO, ETA PHOTO
R4		N*1/2(1688) INTO (LAMBDA K)/TOTAL			(P3)/TOTAL
R4		0.013 OR LESS (95PC CL)	A-BORELLI	67 HBC +	8/67
R4		0.0013	TRIPP	67 RVUE	8/67
R5		N*1/2(1688) INTO (N PI)/(N PI PI)			(P1)/(P5)
R5		1.26 OR LESS (95PC CL)	A-BORELLI	67 HBC +	8/67
R6		N*1/2(1688) INTO (N*3/2(1236) PI)/(N PI PI)			(P4)/(P5)
R6		NO EVIDENCE	A-BORELLI	67 HBC +	8/67
R6		SEE MERLO 66 FOR A REVIEW.			
R7		N*1/2(1688) INTO (NEUTRON PI+)/(P PI+ PI-)			(P6)/(P7)
R7		0.67 0.40	ALEXANDER	67 HBC +	PP 5.5 BEV/C 11/67
R8		N*1/2(1688) INTO (N*(1236)++ PI-)/(P PI+ PI-)			(P8)/(P7)
R8		0.74 0.14	ALEXANDER	67 HBC +	PP 5.5 BEV/C 11/67
R8		1.0 0.3	ALMEIDA	66 HBC +	PP 10 BEV/C
R9		N*1/2(1688) INTO (LAMBDA K)/(P PI+ PI-)			(P3)/(P7)
R9		0.034 OR LESS	ALEXANDER	67 HBC +	PP 5.5 BEV/C 11/67
R10		N*1/2(1688) INTO (PI N)/(PI N*3/2(1236))			(P1)/(P4)
R10		0.77 OR LESS	LEE	67 HBC	11/67

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REFERENCES -- N*1/2(1688)

SEE A PREVIOUS EDITION (RMP 37, 633, 1965) FOR EARLIER REFERENCES.

KRAEMER 64 PR 136 B496	+MADANSKY,+ //J HOPKINS,NWESTERN,WOODSTOCK I	
DUKE 65 PRL 15 468	+JONES,KEMP,MURPHY,PRENTICE, + //RTHFD,OXF IJP	
BRANDSEN 65 PL 19 420	+ODONNELL, MOORHOUSE	//DURHAM,RTHFD IJP
HEUSCH 66 PRL 17 1019	C A HEUSCH, C Y PRESCOTT, R F DASHEN //CIT	
ALMEIDA 66 BERKELEY CONF	+RUSHBROOKE, +	//CAVNDSH,DESY(CERN)
MERLO 66 P RDY SOC 289 489	J P MERLO, G VALLADAS	//SACLAY
ALEXANDE 67 PR 154 1224	ALEXANDER,BENARY,CZAPEK,+ //WEIZMANN(CERN)	
A-BORREL 67 NC 47 232	ALLES-BORELLI,FRENCH,FRISK,MICHEJDA //CERN	
LEE 67 PR 159 1156	+MOEBS,ROE,SINCLAIR,VANDER VELDE //MICH	
TRIPP 67 NP B3 10	+ LEITH, + //LRL,SLAC,CERN,HEIDEL,SACLAY	
BAREYRE 67 PR (SUBMITTED)	P BAREYRE, C BRICMAN, G VILLET	//SACLAY IJP
LOVELACE 67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
SEE ALSO --		
DONNACHI 67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

PAPERS NOT REFERRED TO IN DATA CARDS.

CROUCH 65 DESY CONF 11 21	+ //BROWN,CEA,HARVARD,MIT,PADOVA,WEIZMANN	
DERADO 65 ATHENS CONF 244	+KENNEY,LAMSA, +	//NOTRE DAME,KENTUCKY
ROBERTS 67 PREPRINT	R G ROBERTS	//DURHAM
-- THE ABOVE PAPERS DISCUSS INELASTIC CHANNELS NEAR THE BUMP.		
BAREYRE 65 PL 18 342	+ BRICMAN, STIRLING, VILLET	//SACLAY IJP

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N(1710)

66 N*1/2(1710, JP=1/2-) I=1/2 $S_{1,1}$

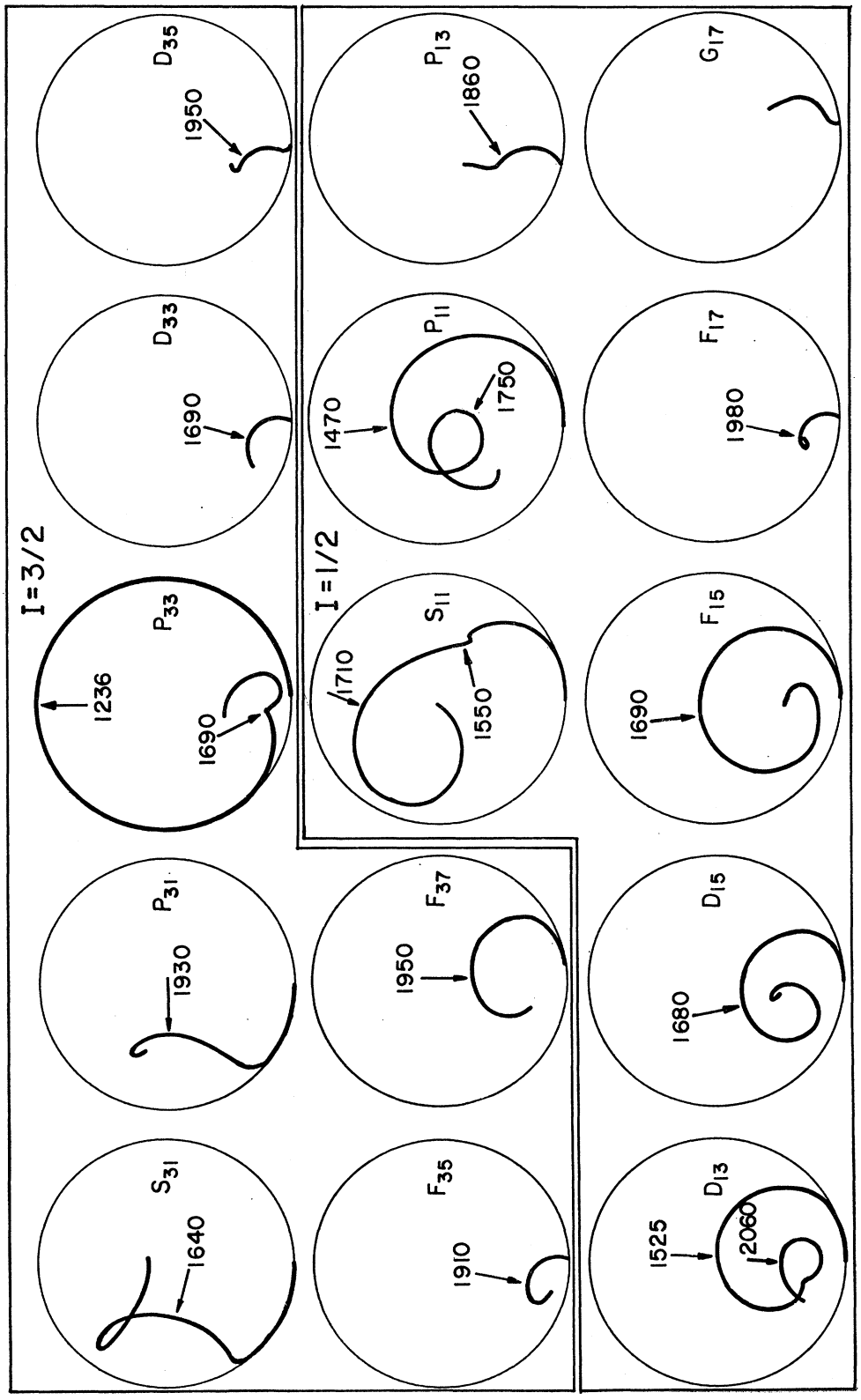
THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

66 N*1/2(1710) MASS (MEV)

M	*	1695.0		BRANDSEN 65 RVUE	PHASE-SHIFT ANAL
M	*	1700.0		MICHAEL 66 RVUE	FITS BAREYRE S11
M	1	1710.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.			
M	2	1665.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
	2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM			
	2	IS GREATEST.			
M		1709.0		LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		WHERE THE ABSORPTION IS GREATEST.			
		SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.			

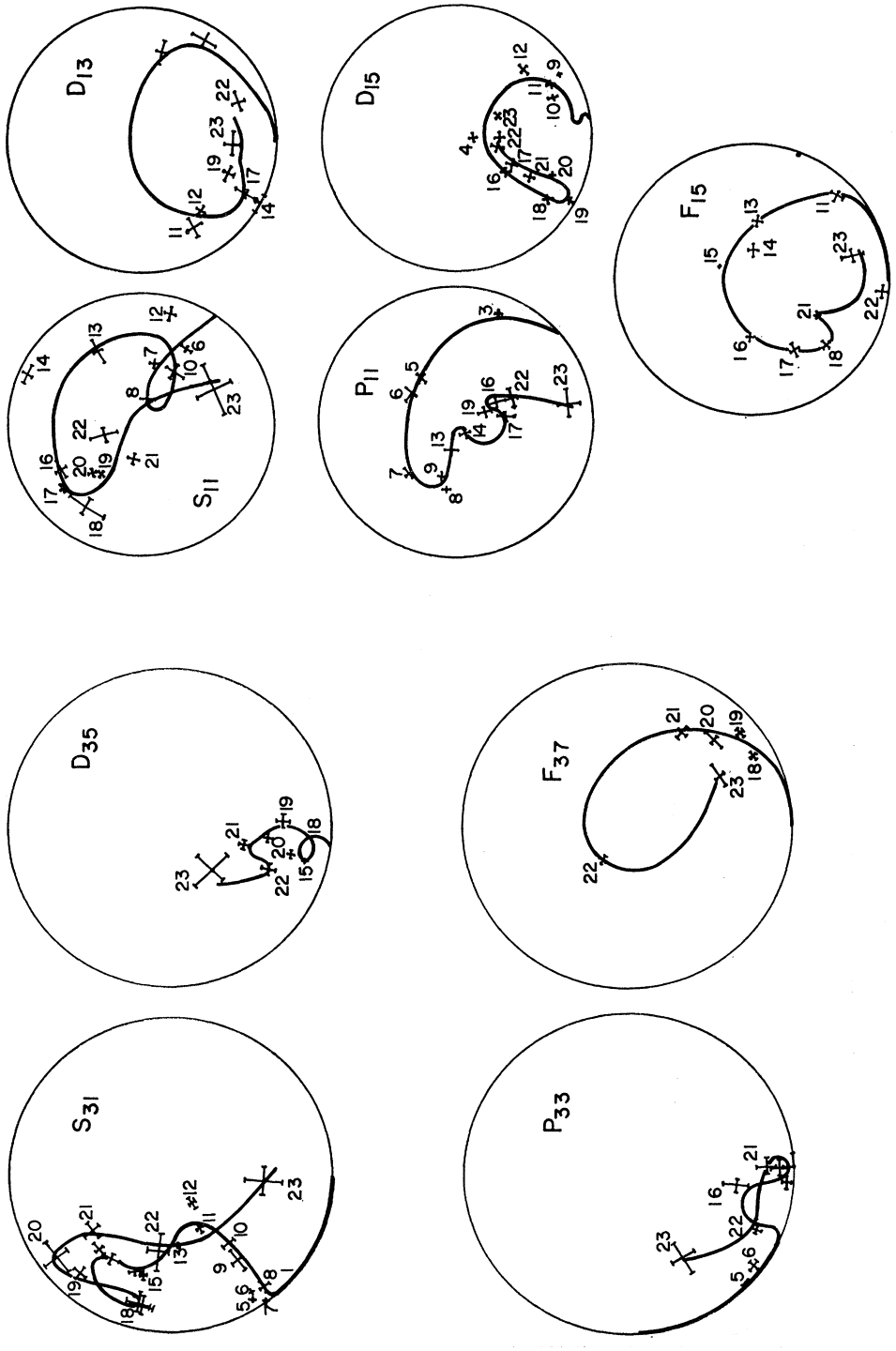
66 N*1/2(1710) WIDTH (MEV)

W	*	240.0		MICHAEL 66 RVUE	
W	1	260.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W	2	110.0		BAREYRE 67 RVUE	PHASE-SHIFT ANAL 11/67
W		300.0		LOVELACE 67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.			



PARTIAL WAVE AMPLITUDES OBTAINED FROM THE DISPERSION RELATION RESULTS OF THE CERN GROUP
(Arrows point to approximate resonance positions.)

PARTIAL WAVE AMPLITUDES OBTAINED BY THE SACLAY PHASE SHIFT ANALYSIS (BAREYRE et al)



ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

---------- 66 N*1/2(1710) PARTIAL DECAY MODES ----------

P1	N*1/2(1710) INTO PI N		S 8S16
P2	N*1/2(1710) INTO N ETA		S17S14
P3	N*1/2(1710) INTO LAMBDA K		S18S11

---------- 66 N*1/2(1710) BRANCHING RATIOS ----------

R1		N*1/2(1710) INTO (PI N)/TOTAL			(P1)/TOTAL	
R1	*	1.0	APPROX	MICHAEL	66 RVUE	
R1	~	0.766		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67

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REFERENCES -- N*1/2(1710)

BAREYRE	65 PL 18 342	+ BRIGMAN, STIRLING, VILLET	//SACLAY IJP
BRANDSEN	65 PL 19 420	+ODONNELL, MOORHOUSE	//DURHAM,RTHFD IJP
MICHAEL	66 PL 21 93	C MICHAEL	//OXF
BAREYRE	67 PR (SUBMITTED)	P BAREYRE, C BRIGMAN, G VILLET	//SACLAY IJP
LOVELACE	67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
	SEE ALSO --		
DONNACHI	67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE	//CERN IJP

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Δ(1920)

83 N*3/2(1920, JP=7/2+) I=3/2 $F_{3,7}$

---------- 83 N*3/2(1920) MASS (MEV) ----------

THE PARAMETERS GIVEN IN THE BARYON-RESONANCE TABLE ARE FROM LOVELACE 67, ROUNDED OFF SOMEWHAT. OTHER POSSIBLE RESONANCES HAVE BEEN UNCOVERED BY THE LATEST PHASE-SHIFT ANALYSES. SEE THE TABLE FOLLOWING THE N*1/2(1518) AND THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.

M	*	1922.0	APPROX	COOL	56 CNTR	PI+ P TOTAL
M	*	1912.0	15.0	BRISSON	61 CNTR	PI+ P TOTAL
M	N	1956.0		LAYSON	63 RVUE	PI P TOTAL, EL
M	N	ASSUMES AN N*3/2(1655).				
M	*	1920.0		HOHLER	64 RVUE	DATA + DISP REL
M	*	1900.0	9.0	DEVLIN	65 CNTR	PI+ P TOTAL
M	*	1920.0	APPROX	DUKE	65 CNTR	PI+- P EL, POLAR
M	*	1950.0	APPROX	YOKOSAWA	66 CNTR	PI- P DSIG + POL
M	1	1975.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
	1	WHERE THE PARTIAL-WAVE TOTAL CROSS SECTION IS GREATEST.				
M	2	1980.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
	2	WHERE THE VELOCITY OF THE AMPLITUDE ACROSS THE ARGAND DIAGRAM				
	2	IS GREATEST.				
M		1946.0		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67
		WHERE THE ABSORPTION IS GREATEST.				
		SEE THE NOTE ON BARYON RESONANCES IN THE MAIN TEXT.				

---------- 83 N*3/2(1920) WIDTH (MEV) ----------

W	*	170.0		HOHLER	64 RVUE	
W	*	256.0	39.0	DEVLIN	65 CNTR	
W	*	170.0		DUKE	65 CNTR	
W	*	200.0	APPROX	YOKOSAWA	66 CNTR	
W	1	180.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
W	2	140.0		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
W		221.0		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				

---------- 83 N*3/2(1920) PARTIAL DECAY MODES ----------

P1	N*3/2(1920) INTO PI N		S 8S16
P2	N*3/2(1920) INTO SIGMA K		S20S10
P3	N*3/2(1920) INTO N*3/2(1236) PI		U8S 8

---------- 83 N*3/2(1920) BRANCHING RATIOS ----------

R1		N*3/2(1920) INTO (PI N)/TOTAL			(P1)/TOTAL	
R1	N	0.33		LAYSON	63 RVUE	
R1	N	ASSUMES AN N*3/2(1855).				
R1	*	0.73	OR LESS	HOHLER	63 RVUE	DATA + DISP REL
R1	*	0.57	0.12	DEVLIN	65 CNTR	
R1	*	0.41		DUKE	65 CNTR	VERY ENERGY DEP
R1	*	0.4	APPROX	YOKOSAWA	66 CNTR	
R1	1	0.57		BAREYRE	67 RVUE	PHASE-SHIFT ANAL 11/67
R1		0.386		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67
		THESE CORRESPOND TO THE DIFFERENT WAYS OF DETERMINING THE MASS.				
R2		N*3/2(1920) INTO (SIGMA K)/TOTAL			(P2)/TOTAL	
R2		SEEN		HOLLADAY	65 RVUE	PI+P DATA 11/66
R3		N*3/2(1920) INTO (PI N)/(PI N*3/2(1236))			(P1)/(P3)	
R3		0.55 OR LESS		LEE	67 HBC	11/67

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REFERENCES -- N*3/2(1920)

COOL	56 PR 103 1082	R COOL, O PICCIONI, D CLARK	//BNL I
BRISSON	61 NC 19 210	+DETOEUF,FALK-VAIRANT,VAN ROSSUM,+//SACLAY I	
LAYSON	63 NC 27 724	W M LAYSON	//CERN IJ
HOHLER	63 NP 48 470	G HOHLER, G EBEL	//KARLSRUHE I
HOHLER	64 PL 12 149	G HOHLER, J GIESECKE	//KARLSRUHE I
DEVLIN	65 PRL 14 1031	T J DEVLIN,J SOLOMON,G BERTSCH //PRINCETON I	
DUKE	65 PRL 15 466	+JONES,KEMP,MURPHY,PARTICE, + //RTHFD,OXF IJP	
HOLLADAY	65 PR 139 B1348	W G HOLLADAY	//VANDERBILT
YOKOSAWA	66 PRL 16 714	+SUWA, HILL, ESTERLING, BOOTH	//ARG,CHI IJP
LEE	67 PR 159 1196	+MOEBS,KOE,SINCLAIR,VANDER VELDE	//MICH
BAREYRE	67 PR (SUBMITTED)	P BAREYRE, C BRIGMAN, G VILLET	//SACLAY IJP
LOVELACE	67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
	SEE ALSO --		
DONNACHI	67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

PAPERS NOT REFERRED TO IN DATA CARDS.

HELLAND	64 PR 134 B1062	+DEVLIN,HAGGE,LONGO,MOYER,WOOD	//LRL IJ
AUVIL	64 NC 33 473	P AUVIL, C LOVELACE	//IMPCOL IJP

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N(2080)

70 N* (2080, JP=) I=

YOON 67 SEE A NARROW BUMP IN THE INVARIANT MASS OF (P PI+ PI- PI0) FROM 3 BEV/C PI- P TO (PI- P PI+ PI- RHO-. AT 3.2 BEV/C, WITH APPROXIMATELY THREE TIMES THE NUMBER OF EVENTS, THE EFFECT IS NOT SEEN (CHUNG 66 AND KIRZ 67). OMITTED FROM TABLE.

---------- 70 N* (2080) MASS (MEV) ----------

M	2080.0	12.0		YOON	67 HBC +	3 BEV/C PI-P 8/67

---------- 70 N* (2080) WIDTH (MEV) ----------

W	40.0	20.0		YOON	67 HBC +	8/67

---------- 70 N* (2080) PARTIAL DECAY MODES ----------

P1	N* (2080) INTO PI N	
P2	N* (2080) INTO N*3/2(1236) RHO	

---------- 70 N* (2080) BRANCHING RATIOS ----------

R1		N* (2080) INTO (N*3/2(1236) RHO)/TOTAL				(P2)/TOTAL	
R1		SEEN			YOON	67 HBC +	8/67

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REFERENCES -- N* (2080)

YOON	67 PL 24B 307	+BERENYI,KEY,PRENTICE, +	//TORONTO,WISC
CHUNG	66 UCRL-16881 THESIS	S U CHUNG	//LRL
KIRZ	67 PRIVATE COMM.	J KIRZ	//LRL

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N(2190)

71 N*1/2(2190, JP=7/2-) I=1/2 $G_{1,7}$

---------- 71 N*1/2(2190) MASS (MEV) ----------

M	2190.0		DIDDENS	63 CNTR	PI+- P TOTAL
M	2210.0		HOHLER	64 RVUE	DATA + DISP REL
M	2190.0	APPROX	YOKOSAWA	66 CNTR	PI- P DSIG + POL
M	2265.0		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67

---------- 71 N*1/2(2190) WIDTH (MEV) ----------

W	200.0		DIDDENS	63 CNTR	
W	200.0		HOHLER	64 RVUE	
W	220.0	APPROX	YOKOSAWA	66 CNTR	
W	298.0		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67

---------- 71 N*1/2(2190) PARTIAL DECAY MODES ----------

P1	N*1/2(2190) INTO PI N	S 8S16
P2	N*1/2(2190) INTO LAMBDA K	S18S11

---------- 71 N*1/2(2190) BRANCHING RATIOS ----------

R1	N*1/2(2190) INTO (PI N)/TOTAL			(P1)/TOTAL	
R1	0.3	APPROX	DIDDENS.	63 CNTR	
R1	0.3	APPROX	YOKOSAWA	66 CNTR	
R1	0.349		LOVELACE	67 RVUE	PHASE-SHIFT ANAL 11/67

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REFERENCES -- N*1/2(2190)

DIDDENS	63 PRL 10 262	+JENKINS, KYCIA, RILEY	//BNL I
HOHLER	64 PL 12 149	G HOHLER, J GIESECKE	//KARLSRUHE I
YOKOSAWA	66 PRL 16 714	+SUWA,HILL,ESTERLING,BOOTH	//ARG,CHI JP
LOVELACE	67 HEIDELBERG CONF.	C LOVELACE	//CERN IJP
	SEE ALSO --		
DONNACHI	67 PREPRINT	A DONNACHIE, R G KIRSOPP, C LOVELACE//CERN IJP	

QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS.

CARROLL	66 PRL 16 288	+CORBETT,DAMERELL,MIDDLEMAS, +	//RTHFD,OXF J-L
CARROLL	66 PRL 17 1274	+CORBETT,DAMERELL,MIDDLEMAS, +	//RTHFD,OXF J-L
	-- ERRATUM CHANGING THE RATHER WEAK DETERMINATION OF J-L TO +1/2.		
KORMANYO	66 PRL 16 709	KORMANYOS,KRISCH,OFALLON, +	//MICH,ARG P
BARGER	66 PRL 16 913	V BARGER, D CLINE	//WISC P

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Δ(2420)

84 N*3/2(2420, JP=11/2+) I=3/2

PARTIAL WAVE ANALYSIS OF BELLAMY 67 SUGGESTS J=11/2

---------- 84 N*3/2(2420) MASS (MEV) ----------

M	*	2360.0		DIDDENS	63 CNTR	PI+ P TOTAL
M	*	2520.0	40.0	ALVAREZ	64 CNTR	PI PHOTOPROD
M	*	2400.0	APPROX	WAHLIG	64 SPRK C	PI-P CH EX
M	*	2440.0		HOHLER	64 RVUE	DATA + DISP REL
M		2423.0	10.0	CITRON	66 CNTR	PI+ P TOTAL
M	B	2452.0		BARGER	66 RVUE	TOTAL + CH EX 11/67

---------- 84 N*3/2(2420) WIDTH (MEV) ----------

W	*	200.0		DIDDENS	63 CNTR	
W	*	245.0		HOHLER	64 RVUE	
W		310.0	20.0	CITRON	66 CNTR	
W	B	275.0		BARGER	66 RVUE	TOTAL + CH EX 11/67

---------- 84 N*3/2(2420) PARTIAL DECAY MODES ----------

P1	N*3/2(2420) INTO PI N		S 8S16
P2	N*3/2(2420) INTO SIGMA K		S20S10

---------- 84 N*3/2(2420) BRANCHING RATIOS ----------

R1		N*3/2(2420) INTO (PI N)/TOTAL				(P1)/TOTAL	
R1	*	0.067	APPROX	DIDDENS	63 CNTR	ASSUMING J=11/2	
R1		0.113	0.0036	CITRON	66 CNTR	ASSUMING J=11/2	
R1	B	0.117	0.004	BARGER	66 FIT	ASSUMING J=11/2	11/67
R1	B	0.12		BARGER	67 FIT	ASSUMING J=11/2	11/67
	B	USES REGGE ANP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE					
	B	FOR CRITICISM TO THIS METHOD SEE DOLEN 67					
R1	D	0.163		DIKMEN	67 FIT	ASSUMING J=11/2	11/67
	D	USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES					
R1		0.06		KORMANYOS	67 CNTR	ASSUMING J=11/2	11/67

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REFERENCES -- N*3/2(2420)

DIDDENS	63 PRL 10 262	+JENKINS, KYCIA, RILEY	//BNL I
ALVAREZ	64 PRL 12 710	+BAR-YAM,KERN,LUCKEY,OSBORNE, +	//MIT,CEA
WAHLIG	64 PRL 13 103	+MANNELLI,SODICKSON,FACKLER,WARD, +	//MIT
HOHLER	64 PL 12 149	G HOHLER, J GIESECKE	//KARLSRUHE I
CITRON	66 PR 144 1101	+GALBRAITH,KYCIA,LEONTIC,PHILLIPS, +	//BNL I
BARGER	66 PR 151 1123	V BARGER, M OLSSON	//WISC
BARGER	67 PR 155 1792	V BARGER, D CLINE	//WISC P
DIKMEN	67 PRL 18 798	F N DIKMEN	//MICH
DOLEN	67 CALT-68-143	DOLEN,HORN,SCHMID////////////////////CALTECH	
KORMANYO	67 PR (ACCEPTED)	KORMANYOS,KRISCH,OFALLON, +	//MICH,ARG P

PAPERS NOT REFERRED TO IN DATA CARDS.

DOBROWOL	67 PL 24B 203	DOBROWOLSKI,GUSKOV,LIKHACHEV, +	//DUBNA P
BELLAMY	67 PRL 19 476	+BUCKLEY,DOBINSON, +	//WESTFIELD,UNICOL JP
BAACKE	67 NC 51A 761	J BAACKE, M YVERT	//KARLSRUHE,CRSAY J-L

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

N(2650)

72 N*1/2(2650, JP= -) I=1/2

72 N*1/2(2650) MASS (MEV)

M	*	2700.0			ALVAREZ	64 CNTR	PI PHOTOPROD	
M	*	2600.0		APPROX	WAHLIG	64 SPRK C	PI-P CH EX	
M	*	2660.0			HOHLER	64 RVUE	DATA + DISP REL	
M		2649.0	10.0		CITRON	66 CNTR	PI+- P TOTAL	
M	*	2633.0			BARGER	66 FIT	TOTAL + CH EX	11/67

72 N*1/2(2650) WIDTH (MEV)

W	*	100.0			ALVAREZ	64 CNTR		
W	*	200.0			HOHLER	64 RVUE		
W		360.0	20.0		CITRON	66 CNTR		
W	*	425.0			BARGER	66 FIT	TOTAL + CH EX	11/67

72 N*1/2(2650) PARTIAL DECAY MODES

P1	N*1/2(2650) INTO PI N	S 8S16
P2	N*1/2(2650) INTO LAMBDA K	S18S11

72 N*1/2(2650) BRANCHING RATIOS

R1	N*1/2(2650) INTO (PI N)/TOTAL				(P1)/TOTAL		
R1	ONLY (J+1/2)*(PI N/TOTAL) MEASURED FOR THIS STATE						
R1		0.436	0.028	CITRON	66 CNTR	TOTAL CRCSS-SEC.	11/67
R1	B	0.456	0.018	BARGER	66 RVUE	TOTAL + CH EXC.	11/67
R1	B	0.30		BARGER	67 RVUE	USES KORMANYOS67	11/67
	B	USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE					
	B	FOR CRITICISM TO THIS METHOD SEE DOLEN 67					
R1	D	0.24		DIKMEN	67 RVUE	USES KORMANYOS66	11/67
	D	USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES					
R1		0.06		KORMANYOS	67 CNTR	PI-P AT 180 DEG.	11/67

REFERENCES -- N*1/2(2650)

ALVAREZ 64 PRL 12 710	+BAR-YAM,KERN,LUCKEY,OSBORNE, +	//MIT,CEA
WAHLIG 64 PRL 13 103	+MANNELLI,SODICKSON,FACKLER,WARD, +	//MIT
HOHLER 64 PL 12 149	G HOHLER, J GIESECKE	//KARLSRUHE I
CITRON 66 PR 144 1101	+GALBRAITH,KYCIA,LEONTIC,PHILLIPS, +	//BNL I
BARGER 66 PR 151 1123	V BARGER, M OLSSON	//WISC
BARGER 67 PR 155 1792	V BARGER, D CLINE	//WISC P
DIKMEN 67 PRL 18 796	F N DIKMEN	//MICH
DOLEN 67 CALT-68-143	DOLEN,HORN,SCHMID//////////////////CALTECH	
KORMANYO 67 PR (ACCEPTED)	KORMANYOS,KRISCH,OFALLON, +	//MICH,ARG P

PAPER NOT REFERRED TO IN DATA CARDS.

BAACKE 67 NC 51A 761	J BAACKE, M YVERT	//KARLSRUHE,ORSAY J-L
KORMANYO 66 PRL 16 709	KORMANYOS,KRISCH,OFALLON+//////////MICH,ARG	

Δ(2850)

85 N*3/2(2850, JP= +) I=3/2

85 N*3/2(2850) MASS (MEV)

M	*	2700.0		APPROX	WAHLIG	64 SPRK C	PI-P CH EX	
M	*	2870.0			HOHLER	64 RVUE	DATA + DISP REL	
M		2850.0	12.0		CITRON	66 CNTR	PI+ P TOTAL	
M	*	2850.0			BARDADIN	66 HBC	++ N* TO P + 3 PIS	

85 N*3/2(2850) WIDTH (MEV)

W		400.0	40.0		CITRON	66 CNTR		
W	*	150.0			BARDADIN	66 HBC	++	

85 N*3/2(2850) PARTIAL DECAY MODES

P1	N*3/2(2850) INTO PI N	S 8S16
P2	N*3/2(2850) INTO P PI PI PI	S16S 6S 8

85 N*3/2(2850) BRANCHING RATIOS

R1	N*3/2(2850) INTO (PI N)/TOTAL				(P1)/TOTAL		
R1	ONLY (J+1/2)*(PI N/TOTAL) MEASURED FOR THIS STATE						
R1		0.261	0.048	CITRON	66 CNTR	TOTAL CRCSS.SEC.	11/67
R1	B	0.224	0.016	BARGER	66 RVUE	TOTAL + CH EXC.	11/67
R1	B	0.40		BARGER	67 RVUE	USES KORMANYOS66	11/67
	B	USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE					
	B	FOR CRITICISM TO THIS METHOD SEE DOLEN 67					
R1	D	0.49		DIKMEN	67 RVUE	USES KORMANYOS67	11/67
	D	USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES					
R1		0.10		KORMANYOS	67 CNTR	PI-P AT 180 DEG.	11/67
R1		0.39		DOBROWOLS	67 CNTR	PI+P AT 180 DEG	

REFERENCES -- N*3/2(2850)

WAHLIG 64 PRL 13 103	+MANNELLI,SODICKSON,FACKLER,WARD, +	//MIT
HOHLER 64 PL 12 149	G HOHLER, J GIESECKE	//KARLSRUHE I
CITRON 66 PR 144 1101	+GALBRAITH,KYCIA,LEONTIC,PHILLIPS, +	//BNL I
BARDADIN 66 PL 21 357	BARDADIN-OTWINOWSKA,DANYSZ, +	//WARSAW
BARGER 66 PR 151 1123	V BARGER, M OLSSON	//WISC
KORMANYO 66 PRL 16 709	KORMANYOS,KRISCH,OFALLON+//////////MICH,ARG	
BARGER 67 PR 155 1792	V BARGER, D CLINE	//WISC P
DIKMEN 67 PRL 18 796	F N DIKMEN	//MICH
DOLEN 67 CALT-68-143	DOLEN,HORN,SCHMID//////////////////CALTECH	
DOBROWOL 67 PL 24B 263	DOBROWOLSKI,GUSKOV,LIKHACHEV, +	//DUBNA P
KORMANYO 67 PR (ACCEPTED)	KORMANYOS,KRISCH,OFALLON, +	//MICH,ARG P

PAPERS NOT REFERRED TO IN DATA CARDS.

BAACKE 67 NC 51A 761	J BAACKE, M YVERT	//KARLSRUHE,ORSAY J-L

N(3030)

73 N*1/2(3030, JP=) I=1/2

73 N*1/2(3030) MASS (MEV)

M	*	3080.0			HOHLER	64 RVUE	DATA + DISP REL	
M		3030.0			CITRON	66 CNTR	PI+- P TOTAL	

73 N*1/2(3030) WIDTH (MEV)

W		400.0			CITRON	66 CNTR		

73 N*1/2(3030) PARTIAL DECAY MODES

P1	N*1/2(3030) INTO PI N	S 8S16

73 N*1/2(3030) BRANCHING RATIOS

R1	N*1/2(3030) INTO (PI N)/TOTAL				(P1)/TOTAL		
R1	ONLY (J+1/2)*(PI N/TOTAL) MEASURED FOR THIS STATE						
R1		0.048		CITRON	66 CNTR	TOTAL CRCS.SEC.	11/67
R1	B	0.06	0.016	BARGER	66 RVUE	TOTAL + CH EXC.	11/67
R1	B	0.12		BARGER	67 CNTR	USES KORMANYOS66	11/67
	B	USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE					
	B	FOR CRITICISM TO THIS METHOD SEE DOLEN 67					
R1	D	0.016		DIKMEN	67 RVUE	USES KORMANYOS67	11/67
	D	USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES					

REFERENCES -- N*1/2(3030)

HOHLER 64 PL 12 149	G HOHLER, J GIESECKE	//KARLSRUHE I
CITRON 66 PR 144 1101	+GALBRAITH,KYCIA,LEONTIC,PHILLIPS, +	//BNL I
BARGER 66 PR 151 1123	V BARGER, M OLSSON	//WISC
KORMANYO 66 PRL 16 709	KORMANYOS,KRISCH,OFALLON+//////////MICH,ARG	
BARGER 67 PR 155 1792	V BARGER, D CLINE	//WISC P
DIKMEN 67 PRL 18 796	F N DIKMEN	//MICH
DOLEN 67 CALT-68-143	DOLEN,HORN,SCHMID//////////////////CALTECH	

Δ(3230)

86 N*3/2(3230, JP=) I=3/2

86 N*3/2(3230) MASS (MEV)

M		3230.0			CITRON	66 CNTR	PI+ P TOTAL	

86 N*3/2(3230) WIDTH (MEV)

W		440.0			CITRON	66 CNTR		

86 N*3/2(3230) PARTIAL DECAY MODES

P1	N*3/2(3230) INTO PI N	S 8S16

86 N*3/2(3230) BRANCHING RATIOS

R1	ONLY (J+1/2)*(PI N/TOTAL) MEASURED FOR THIS STATE						
R1		0.06		CITRON	66 CNTR	TOTAL CRCS. SEC.	11/67
R1	B	0.03	0.01	BARGER	66 RVUE	TOTAL + CH EXC.	11/67
R1	B	0.03 TO 0.1		BARGER	67 CNTR	USES KORMANYOS66	11/67
	B	USES REGGE AMP.+RESON. TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGRE					
	B	FOR CRITICISM TO THIS METHOD SEE DOLEN 67					
R1	D	0.25		DIKMEN	67 RVUE	USES KORMANYOS67	11/67
	D	USES ONLY RESONANCES TO CALCULATE DIF. CROSS SECTIONS AT 180 DEGREES					

REFERENCES -- N*3/2(3230)

CITRON 66 PR 144 1101	+GALBRAITH,KYCIA,LEONTIC,PHILLIPS, +	//BNL I
BARGER 66 PR 151 1123	V BARGER, M OLSSON	//WISC
KORMANYO 66 PRL 16 709	KORMANYOS,KRISCH,OFALLON+//////////MICH,ARG	
BARGER 67 PR 155 1792	V BARGER, D CLINE	//WISC P
DIKMEN 67 PRL 18 796	F N DIKMEN	//MICH
DOLEN 67 CALT-68-143	DOLEN,HORN,SCHMID//////////////////CALTECH	

N?(3245)

74 N* (3245, JP= +)

EXISTENCE NOT CONCLUSIVELY ESTABLISHED. I-SPIN NOT DETERMINED, BUT THE NARROW WIDTH PRECLUDES IDENTIFICATION WITH THE N*3/2(3230). OMITTED FROM TABLE.

74 N* /2(3245) MASS (MEV)

M		3245.0	10.0		KORMANYOS	66 CNTR	PI-P EL AT 180 D	

74 N* /2(3245) WIDTH (MEV)

W		35.0	OR LESS		KORMANYOS	66 CNTR		

74 N* /2(3245) PARTIAL DECAY MODES

P1	N* /2(3245) INTO PI N	S 8S16

REFERENCES -- N* /2(3245)

KORMANYO 67 PR (ACCEPTED)	KORMANYOS,KRISCH,OFALLON, +	//MICH,ARG P

N(3690)

75 N*1/2(3690, JP=) I=1/2

A BUMP SEEN IN THE INVARIANT MASS OF A VERY COMPLICATED STATE (N + SEVEN PIS), SO AS EVIDENCE FOR A NEW RESONANCE IT IS NOT CONCLUSIVE. NOT INCLUDED IN TABLE.

75 N*1/2(3690) MASS (MEV)

M		3690.0	10.0		BARTKE	67 HBC	+ PI+P 8 PRONGS	8/67

75 N*1/2(3690) WIDTH (MEV)

W		50.0	30.0		BARTKE	67 HBC	+	8/67

75 N*1/2(3690) PARTIAL DECAY MODES

P1	N*1/2(3690) INTO N + 7 PIS	+

REFERENCES -- N*1/2(3690)

BARTKE 67 PL 24B 118	+CZYZEWSKI,DANYSZ, +	//CRACOW,ORSAY(CERN) I

N*5/2(1560)

91 N*5/2(1560, JP=) I=5/2

IT HAS BEEN SUSPECTED ALMOST FROM THE BEGINNING THAT THIS IS A KINEMATIC EFFECT AND NOT A RESONANCE. RECENT EVIDENCE STRONGLY SUPPORTING THIS INTERPRETATION IS GIVEN IN GOLDHABER 67. OMITTED FROM TABLE.

91 N*5/2(1560) MASS (MEV)

M		1560.0	20.0		GOLDHABER	64 HBC	+++3.65 BEV/C PI+ P	
M		1570.0			ALEXANDER	67 HBC	+++PP 4PI 5.5 BEV/C	

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED

Σ

1E LAMBDA (1115,JP=1/2+) I=0

SEE LISTINGS OF STABLE PARTICLES

Λ(1405)

37 Y*0(1405, JP=1/2-) I=0 $S_{0,1}$

THIS RESONANCE CAN BE IDENTIFIED WITH THE VIRTUAL BOUND STATE IN THE KBAR-N SYSTEM DEDUCED FROM THE I=0 SCATTERING LENGTH DETERMINED FROM LOW ENERGY K-P INTERACTIONS. THE DIFFICULTIES IN EXTRAPOLATING FROM THE PHYSICAL REGION TO THE RESONANCE LOCATION ARE DISCUSSED BY DALITZ 67. PARAMETERS USED IN AVERAGING ARE FROM PRODUCTION EXPERIMENTS ONLY.

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37 Y*0(1405) MASS (MEV)

M		1405.0			ALSTON	61 HBC	K-P 1.15 BEV/C	
M		1410.0			ALEXANDER	62 HBC	PI-P 2.1 BEV/C	
M		1405.0			ALSTON	62 HBC	K-P 1.2-2.5 BEV/C	
M		1400.0	24.0		MUSGRAVE	65 HBC	PBAR P 3-4 BEV/C	
M	*	1382.0	8.0		ENGLER	65 HDBC	PI-P, PI+D 1.68	
M	*	1410.7	1.0		KIM	65 HBC	O-EFF-RANGE FIT	
M	N	1409.6	1.7		SAKITT	65 HBC	O-EFF-RANGE FIT	
M	N	DATA OF SAKITT ARE USED IN FIT BY KITTEL.						
M	*	1407.5	1.2		KITTEL	66 HBC	O-EFF-RANGE FIT	
M	67	1400.0	5.0		BIRMINGHA	66 HBC	3.5 K- P	9/67
M	*	1403.0	3.0		KIM	67 HBC	K MATRIX FIT(KP)	8/67
M		. . . . .						
M	AVG	1400.0000	4.8949	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

37 Y*0(1405) WIDTH (MEV)

W		20.0			ALSTON	61 HBC		
W		35.0	5.0		ALEXANDER	62 HBC		
W		50.0			ALSTON	62 HBC		
W		60.0	20.0		MUSGRAVE	65 HBC		
W	*	69.0	26.0		ENGLER	65 HDBC		
W	*	37.0	3.2		KIM	65 HBC		
W	N	28.2	4.1		SAKITT	65 HBC		
W	N	DATA OF SAKITT ARE USED IN FIT BY KITTEL.						
W	*	34.1	4.1		KITTEL	66 HBC		
W	67	50.0	10.0		BIRMINGHA	66 HBC	3.5 K- P	9/67
W	*	50.0	5.0		KIM	67 HBC	K MATRIX FIT(KP)	8/67
W		. . . . .						
W	AVG	39.0476	5.3026	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)				

37 Y*0(1405) PARTIAL DECAY MODES

P1	Y*0(1405) INTO SIGMA PI		S20S 8

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REFERENCES -- Y*0(1405)

ALSTON	61 PRL 6 698	+ALVAREZ,EBERHARD,GOOD,GRAZIANO, +	//LRL I
ALEXANDE	62 PRL 8 447	ALEXANDER,KALBFLEISCH,MILLER,SMITH	//LRL I
ALSTON	62 CERN CONF 311	+ALVAREZ,FERRO-LUZZI,ROSENFELD, +	//LRL I
MUSGRAVE	65 NC 35 735	+PETMEZAS,+//BIRMGHM,CEAN,EP,IMPCOL,SACLAY	
ENGLER	65 PRL 15 224	+FISK,KRAEMER,METLZER,WESTGARD,+//CRNG,BNL	IJ
KIM	65 PRL 14 29	J K KIM	//COLLMBIA IJP
SAKITT	65 PR 139 B719	+DAY,GLASSER,SEEMAN,FRIEDMAN, +	//MC,LRL IJP
KITTEL	66 PL 21 349	W KITTEL, G OTTER, I WACEK	//VIENNA IJP
BIRMINGH	66 PR 152 1148	BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD	
DALITZ	67 PR 153 1617	DALITZ, WONG, RAJASEKARAN	//OXFORD,BOMBAY
KIM	67 PRL 19 1074	J KIM	//////////////////////////////YALE JP

PAPERS NOT REFERRED TO IN DATA CARDS.

ABRAMS	65 PR 139 B454	G S ABRAMS, B SECHI-ZORN	//MD IJP
KADYK	66 PRL 17 537	+CREN, G+S GOLDHABER, TRILLING	//LRL IJP
DONALD	66 PL 22 711	+ EDWARDS, LYS, NISAR, MOORE	//LIVERPOOL

-- ABRAMS 65, KADYK 66, AND DONALD 66 SUPPORT THOSE EFFECTIVE-RANGE-FIT SOLUTIONS GIVING AN I=0 S1/2 RESONANCE.

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Λ(1520)

38 Y*0(1520, JP=3/2-) I=0 $D_{0,3}$

38 Y*0(1520) MASS (MEV)

M		1519.4	2.0		WATSON	63 HBC	K-P ALL CHANNELS	
M	145	1517.2	3.0		GALTIERI	63 HBC	K-D 1.91 BEV/C	
M	29	1520.0	4.0		ALMEIDA	64 HBC	K-P 1.45 BEV/C	
M		1511.0	15.0		MUSGRAVE	65 HBC	PBAR P 3-4 BEV/C	
M	* 30	1510.0	2.0		BIRMINGHA	66 HBC	3.5 K- P	9/67
M		. . . . .						
M	AVG	1518.8293	1.5264	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

38 Y*0(1520) WIDTH (MEV)

W		16.4	2.0		WATSON	63 HBC		
W	*	19.0	19.0		MUSGRAVE	65 HBC		
W	* 30	30.0	10.0		BIRMINGHA	66 HBC	3.5 K- P	9/67
W		18.0	OR LESS		HARDY	66 HBC		

38 Y*0(1520) PARTIAL DECAY MODES

P1	Y*0(1520) INTO KBAR N		S11S17
P2	Y*0(1520) INTO SIGMA PI		S20S 8
P3	Y*0(1520) INTO LAMBDA PI PI		S10S 8S 8

38 Y*0(1520) PARTIAL WIDTHS (MEV)

W1		Y*0(1520) INTO KBAR N					(P1)	
W1		4.8	0.5		WATSON	63 HBC		
W2		Y*0(1520) INTO SIGMA PI					(P2)	
W2		9.0	1.0		WATSON	63 HBC		

38 Y*0(1520) BRANCHING RATIOS

R1	Y*0(1520) INTO (SIGMA PI)/(KBAR N)						(P2)/(P1)	
R1		0.96	0.20		HARDY	66 HBC	PI-P 1.6-4 GEV/C	
R1		0.73	0.11		DAUBER	67 HBC	K-P AT 2.6GEV/C	8/67
R1		1.72	.78		MUSGRAVE	65 HBC		8/67
R1		. . . . .						
R1	AVG	.7975	.0974	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				
R2	Y*0(1520) INTO (LAMBDA PI PI)/(KBAR N)						(P3)/(P1)	
R2		0.17	0.05		HESS	66 HBC	PI-P 1.6-4 GEV/C	
R2		0.21	0.18		DAUBER	67 HBC	K-P AT 2.6GEV/C	8/67
R2		. . . . .						
R2	AVG	.1729	.0482	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				
R3	Y*0(1520) INTO (SIGMA PI)/(LAMBDA PI PI)						(P2)/(P3)	
R3		4.5	1.0		ARMENTERO	65 HBC		
R3		3.3	1.1		BIRMINGHA	66 HBC	3.5 K- P	9/67
R3		4.8	1.2		UHLIG	67 HBC	K-P .9-1.0 BEV/C	
R3		. . . . .						
R3	AVG	4.1892	.6298	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

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$Z_0(1865)$

96 Z*0(1865, JP=) I=0

THE SIZE AND NARROWNESS OF THE I=0 PEAK MAKE IT DIFFICULT TO INTERPRET IT AS OTHER THAN RESONANT. THE DISPERSION-RELATION ANALYSIS BY CARTER 67 SUPPORTS A RESONANCE INTERPRETATION. BUT IN VIEW OF THE IMPLICATIONS OF THE EXISTENCE OF S=+1 BARYONS, IT MUST BE STRESSED THAT THE RESONANCE INTERPRETATION IS NOT CONCLUSIVELY ESTABLISHED.

96 Z*0(1865) MASS (MEV)

M		1868.0	10.0		KYCIA	67 CNTR	K+P, D TOTAL	8/67
M		1860.0	15.0		CARTER	67 THEO	DISPERSION REL.	8/67
M		. . . . .						
M	AVG	1865.5385	8.3205	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

96 Z*0(1865) WIDTH (MEV)

W		100.0	30.0		KYCIA	67 CNTR		8/67
W		200.0	50.0		CARTER	67 THEO		8/67
W		. . . . .						
W	AVG	170.5862	25.724d	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)				

96 Z*0(1865) PARTIAL DECAY MODES

P1	Z*0(1865) INTO K N		S10S17

96 Z*0(1865) BRANCHING RATIOS

R1	Z*0(1865) INTO (K N)/TOTAL						(P1)/TOTAL	
R1		0.46	0.05		KYCIA	67 CNTR	IF J=1/2	8/67
R1		0.31	0.05		CARTER	67 THEO	IF J=1/2	8/67
R1		. . . . .						
R1	AVG	.3550	.0450	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)				

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REFERENCES -- Z*0(1865)

KYCIA	67 PRIVATE COMM.	T F KYCIA	//BNL I
CARTER	67 PRL 18 601	A A CARTER	//CAVENDISH

PAPER NOT REFERRED TO IN DATA CARDS.

COOL	66 PRL 17 102	+GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL I

-- REPLACED BY KYCIA 67.

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$Z_1(1900)$

97 Z*1(1900, JP=) I=1

MOST OF THE BUMP IN THE CROSS SECTION IS DUE TO A BUMP IN THE K+P CHANNEL NEAR ITS THRESHOLD. ANALYSIS OF THIS CHANNEL (BLAND 67) NEITHER REQUIRES NOR SUGGESTS THAT ANY OF THE MAIN AMPLITUDES PRESENT BE RESONATING. NEITHER DOES A DISPERSION RELATION ANALYSIS OF THE TOTAL CROSS-SECTION DATA (CARTER 67) SUGGEST THE EXISTENCE OF A RESONANCE. AN ANALYSIS USING THE K-MATRIX FORMALISM (HITE 67) REPRODUCES THE MAIN FEATURES OF THE DATA WITHOUT INVOKING A RESONANCE. OMITTED FROM TABLE.

THERE IS EVIDENCE FOR OTHER STRUCTURE IN K+ NUCLEON INTERACTIONS. SEE THE SUPPLEMENTARY REFERENCES FOR SOURCES AND COMMENTS. A CONSERVATIVE INTERPRETION, ADVISABLE IN THE LIGHT OF THE IMPLICATIONS OF S=+1 BARYONS, IS THAT THE EFFECTS CAN EVENTUALLY BE EXPLAINED AS THRESHOLD EFFECTS OR, IN THE CASE OF PRODUCTION EXPERIMENTS, AS REFLECTIONS AND KINEMATIC EFFECTS. TUNE IN NEXT ISSUE.

97 Z*1(1900) MASS (MEV)

M		1900.0	10.0		KYCIA	67 CNTR ++	K+P TOTAL	8/67

97 Z*1(1900) WIDTH (MEV)

W		200.0	50.0		KYCIA	67 CNTR ++		8/67

97 Z*1(1900) PARTIAL DECAY MODES

P1	Z*1(1900) INTO K N		S10S16
P2	Z*1(1900) INTO N*3/2(1236) K		L&1S10

97 Z*1(1900) BRANCHING RATIOS

R1	Z*1(1900) INTO (K N)/TOTAL						(P1)/TOTAL	
R1		0.25	0.06		KYCIA	67 CNTR ++	IF J=1/2	8/67
R1		0.10	OR LESS		CARTER	67 THEO	DISPERSION REL.	8/67
R2	Z*1(1900) INTO (N*3/2(1236) K)/TOTAL						(P2)/TOTAL	
R2	DOMINANT CONTR TO PEAK BLAND . 67 HBC ++							8/67

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REFERENCES -- Z*1(1900)

KYCIA	67 PRIVATE COMM.	T F KYCIA	//BNL I
CARTER	67 PRL 18 601	A A CARTER	//CAVENDISH
BLAND	67 PRL 18 1077	+LOWLER,BROWN,G+S GOLDHABER,SEEGER,+	//LRL
HITE	67 THESIS	G E HITE	//ILLINOIS

PAPERS NOT REFERRED TO IN DATA CARDS.

COOL	66 PRL 17 102	+GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL I

-- REPLACED BY KYCIA 67.

LEA	66 PL 23 360	LEA, MARTIN, OALES	//COPENHAGEN,NORDITA

-- A PRELIMINARY PHASE-SHIFT ANALYSIS. THERE IS NOT MUCH DATA TO ANALYZE. THE ONLY WAVE CANDIDATE FOR RESONANCEHOOD IS THE P1/2.

ABRAMS	67 PRL 19 259	+COOL,GIACOMELLI,KYCIA,LEONTIC,LI, + //BNL

-- NEW TOTAL CROSS-SECTION DATA SHOWING SMALL I=1 BUMPS AT 2190 AND 2505 AND &GADERLINE INDICATIONS OF I=0 STRUCTURE.

TYSON	67 PRL 19 255	+GREENBERG,HUGHES,LU,MINEHART,MORI, //YALE

-- GAMMA + P TO K- + MISSING MASS. ARE THE BUMPS IN THE MISSING-MASS DISTRIBUTION DUE TO S=+1 BARYONS ...

BIRNBAUM	67 HEIDELBERG CONF.	+EDELSTEIN,HEIN,MCMAHON, +	//CARNEGIE,BNL

-- PI- + P TO K- + MISSING MASS. SAME QUESTION AS FOR TYSON 67.

MEYER	67 HEIDELBERG CONF.	J MEYER	//SACLAY

-- A SUMMARY BY THE RAPPORTEUR ON BARYONS WITH S NOT ZERO.

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

REFERENCES -- Y*0(1520)

WATSON	63 PR 131 2248	M G WATSON, M FERRO-LUZZI, R D TRIPP //LRL IJP
GALTIERI	63 PL 6 296	A BARBARO-GALTIERI,A HUSSAIN,RD TRIPP//LRL
ALMEIDA	64 PL 9 204	S P ALMEIDA, G R LYNCH //CERN
MUSGRAVE	65 NC 35 735	+PETMEZAS,+//BIRMGHM,CERN,EP,IMPCOL,SACLAY
ARMENTER	65 PL 19 338	ARMENTEROS,F-LUZZI, + //CERN,HEIDEL,SACLAY
BIRMINGH	66 PR 152 1148	BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
HARDY	66 UCRL-16780 THESIS	L M HARDY //LRL
HESS	66 UCRL-16832 THESIS	R I HESS //LRL
DAUBER	67 PL 24E 525	+MALAMUD,SCHLEIN,SLATER,STORK/////////UCLA
UHLIG	67 PR 155 1448	+CHARLTON,CONDON,GLASSER,YCCH,+////MD,USNRL

Δ (1670) $S_{0,1}$

40 Y*0(1670, JP=1/2-) I=0

40 Y*0(1670) MASS (MEV)

M		1660.0		Y-CHANG	64 P&C	PI-PRP 7-8 BEV/C	
M		1670.0		BERLEY	65 HBC	K-P TO LAM ETA	
M	N 50	1645.0	6.0	BIRMINGHA	66 HBC +	K-P AT 3.5 GEV/C	11/67
M	N	AUTHORS SEE A SIGNAL IN NEUTRAL (SIG PI) BUT NOT IN CHARGED. IT IS NOT CLEAR THAT IT CORRESPONDS TO THIS STATE					
M		1660.		BUBELEV	67 PBC	PI-PRP AT 4GEV/C	8/67

40 Y*0(1670) WIDTH (MEV)

W		20.0	OR LESS	Y-CHANG	64 P&C		
W		10.0		BERLEY	65 HBC		
W	N 50	40.0	10.0	BIRMINGHA	66 HBC +	K-P AT 3.5 GEV/C	11/67
W	N	AUTHORS SEE A SIGNAL IN NEUTRAL (SIG PI) BUT NOT IN CHARGED. IT IS NOT CLEAR THAT IT CORRESPONDS TO THIS STATE					
W		20.	OR LESS	BUBELEV	67 PBC	PI-PRP AT 4GEV/C	8/67

40 Y*0(1670) PARTIAL DECAY MODES

P1	Y*0(1670) INTO KBAR N	S11S17
P2	Y*0(1670) INTO LAMBDA ETA	S10S14
P3	Y*0(1670) INTO SIGMA PI	S20S 8

40 Y*0(1670) BRANCHING RATIOS

R1 *	Y*0(1670) INTO ((KBAR N)(LAM ETA))/TOTAL**2			(P1*P2)/TOTAL**2		
R1	0.046		BERLEY	65 HBC		

REFERENCES -- Y*0(1670)

Y-CHANG	64 DUBNA CONF I 615	YUNG-CHANG, IN, KLADNITSKAYA, + //DUBNA I
BERLEY	65 PRL 15 641	+CONNOLLY,HART,RAHM,STONEHILL, + //UNL IJP
BIRMINGH	66 PR 152 1148	BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
BUBELEV	67 PL 24B 246	+CHADRAA,CHUVILO,MI IN+//////JINR,BUC,CERN

Δ (1690) $D_{0,3}$

55 Y*0(1690, JP=3/2-) I=0

SPIN-PARITY DETERMINATION TENTATIVE.

55 Y*0(1690) MASS (MEV)

M	S	1682.0	2.0	ARMENTERO	67 HBC	C KP TO SIGMA PI	8/67
M	S	1699.0	2.0	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
M	S	SYSTEMATIC ERRORS NOT INCLUDED. ONLY INDETERM. IN FIT QUOTED					11/67
M		1698.0	5.0	DAVIES	67 CNTR	K-P, D TOTAL	11/66

55 Y*0(1690) WIDTH (MEV)

W	S	55.0	4.0	ARMENTERO	67 HBC	C KP TO SIGMA PI	8/67
W	S	33.0	15.0	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
W	S	SYSTEMATIC ERRORS NOT INCLUDED. ONLY INDETERM. IN FIT QUOTED					11/67
W		40.0	10.0	DAVIES	67 CNTR		11/66

55 Y*0(1690) PARTIAL DECAY MODES

P1	Y*0(1690) INTO KBAR N	S11S17
P2	Y*0(1690) INTO SIGMA PI	S20S 8

55 Y*0(1690) BRANCHING RATIOS

R1	Y*0(1690) INTO (KBAR N)/TOTAL			(P1)/TOTAL		
R1	0.19	0.07	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
R1	0.24		DAVIES	67 CNTR	ASSUMING J=3/2	11/66
R2	Y*0(1690) INTO (SIGMA PI)*(KBAR N)/TOTAL**2			(P2*P1)/TOTAL**2		
R2	0.116	0.014	ARMENTERO	67 HBC	C	8/67

REFERENCES -- Y*0(1690)

ARMENTER	66 BERKELEY CONF	ARMENTEROS,F-LUZZI, + //CERN,HEIDEL,SACLAY IJP
ARMENTER	67 PL 24B 196	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE1	67 CERN 67-17 TBP	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
DAVIES	67 PRL 18 62	+COWELL,HATTERSLEY,ROMEK+//BIRMI,CAMB,RUTH I

Δ (1815) $F_{0,5}$

35 Y*0(1815, JP=5/2+) I=0

33 Y*0(1815) MASS (MEV)

M	*	1815.0		GALTIERI	63	K-P RVUE	
M		1815.0		EIRGE	65 HBC	KBAR N,LAM PI PI	
M	* 50	1810.0	20.0	BIRMINGHA	66 HBC	3.5 K- P	9/67
M	N	1811.0	4.0	GELFAND	66 HBC	C BGD PURE IMAG	8/67
M	N	1811.0	4.0	LEVI SETT	66 RVUE	SOME REAL BGD	
M	N	RES + DIFFRACTIVE BGD FOR K-P EL. DATA ARE IN ARMENT 67 FITS TOO.					
M		1819.0	2.0	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
M		1813.0	2.0	ARMENTERO	67 HBC	C K-P TO SIGMA PI	8/67
M		1816.0	4.0	BELL	67 HDBC	OKP,KD TO SIG PI	11/67
M		1819.0	5.0	DAVIES	67 CNTR	K-P, D TOTAL	11/66
M		* * * * * * * * *					
M	AVG	1816.1736	1.6324	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)			

35 Y*0(1815) WIDTH (MEV)

W	*	70.0		GALTIERI	63		
W		60.0		EIRGE	65 HBC		
W	50	110.0	50.0	BIRMINGHA	66 HBC	3.5 K- P	9/67
W	N	73.0	16.0	LEVI SETT	66 RVUE	SOME REAL BGD	
W	N	73.0	16.0	GELFAND	66 HBC	C BGD PURE IMAG	8/67
W	N	RES + DIFFRACTIVE BGD FOR K-P EL. DATA ARE IN ARMENT 66 FITS TOO.					
W		87.0	15.0	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
W		70.0	7.0	ARMENTERO	67 HBC	C K-P TO SIGMA PI	8/67
W		64.0	12.0	BELL	67 HDBC	OKP,KD TO SIG PI	11/67
W		90.0	15.0	DAVIES	67 CNTR		11/66
W		* * * * * * * * *					
W	AVG	73.7874	5.2241	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

39 Y*0(1815) PARTIAL DECAY MODES

P1	Y*0(1815) INTO KBAR N	S11S17
P2	Y*0(1815) INTO SIGMA PI	S20S 8
P3	Y*0(1815) INTO Y*1(1385) PI	L43S 8
P4	Y*0(1815) INTO LAMBDA ETA	S16S14

39 Y*0(1815) BRANCHING RATIOS

R1	Y*0(1815) INTO (KBAR N)/TOTAL			(P1)/TOTAL		
R1 *	0.8		GALTIERI	63	K-P RVUE	
R1 N	0.67	0.06	LEVI SETT	66 RVUE	SOME REAL BGD	
R1 N	0.67	0.08	GELFAND	66 HBC	C BGD PURE IMAG	8/67
R1 N	RES + DIFFRACTIVE BGD FOR K-P EL. DATA ARE IN ARMENT 66 FITS TOO.					
R1	0.65		KYCIA	67 CNTR	TOTAL CROSS-SEC.	8/67
R1	0.63	0.01	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
R1	0.74		DAVIES	67 CNTR		11/66
R2	Y*0(1815) INTO (SIGMA PI)*(KBAR N)/TOTAL**2			(P2*P1)/TOTAL**2		
R2	0.073	0.005	ARMENTERO	67 HBC	C	8/67
R2	0.054	0.012	BELL	67 HDBC	OKP,KD TO SIG PI	11/67
R2	* * * * * * * * *					
R2 AVG	.0702	.0067	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)			
R3	Y*0(1820) INTO (Y*1(1385) PI)*(KBAR N)/TOTAL**2			(P3*P1)/TOTAL**2		
R3	0.057	0.013	ARMENTER2	67 HBC	C K-P TO LAM.PI PI	8/67
R4	Y*0(1815) INTO (Y*1(1385) PI)/TOTAL			(P3)/TOTAL		
R4	0.20	0.05	EIRGE	65 HBC		
R5	Y*0(1815) INTO (LAMBDA ETA)/TOTAL			(P4)/TOTAL		
R5	0.01		ARMENTERO	66 HBC		

REFERENCES -- Y*0(1815)

GALTIERI	63 PL 6 296	A BARBARO-GALTIERI,A HUSSAIN,RD TRIPP//LRL IJ
EIRGE	65 ATHENS CONF 296	+ELY,KALMUS,KERNAN,LOUIE,SAHOURIA, + //LRL IJP
BIRMINGH	66 PR 152 1148	BIRMINGHAM,GLASGOW,I.C., OXFORD,RUTHERFORD
GELFAND	66 PRL 17 1224	+HARMSEN,LEVI-SETTI,PREDAZZI+//EFINS,ARGON
LEVI SET	66 BERKELEY CONF	R LEVI SETTI, E PREDAZZI //CHI
ARMENTER	67 PL 24B 196	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY IJP
ARMENTE1	67 CERN 67-17 TBP	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY IJP
ARMENTE2	67 ZEIT.PHYS.202,486	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
BELL	67 PRL 19 936	R B BELL ////////////////////////////L R L
DAVIES	67 PRL 18 62	+COWELL,HATTERSLEY,ROMEK+//BIRMI,CAMB,RUTH
KYCIA	67 PRIVATE COMM.	T F KYCIA //ONL I

PAPERS NOT REFERRED TO IN DATA CARDS.

CHAMBERL	62 PR 125 1696 CHAMBERLAIN,CROWE,KEEFE,KERTH, + //LRL I
	-- FIRST SEEN IN CHAMBERLAIN 62 TOTAL CROSS SECTION MEASUREMENTS.
SODICKSO	64 PR 133 B757 SODICKSON,MANNELLI,FRISCH,WAHLIG//MIT(ONL) J
HOLLEY	65 UCRL-16274 THESIS W R HOLLEY //LRL J
	-- SODICKSON 64 AND HOLLEY 65 ELASTIC SCATTERING WORK INDICATED J=5/2.

Δ (1830) $D_{0,5}$

56 Y*0(1830, JP=5/2-) I=0

56 Y*0(1830) MASS (MEV)

M		1827.0	3.0	ARMENTERO	67 HBC	C K-P TO SIGMA PI	8/67
M		1817.0	20.	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
M		1837.	11.	BELL	67 HDBC	OKP,KD TO SIG PI	11/67
M		* * * * * * * * *					
M	AVG	1827.4730	2.8645	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

56 Y*0(1830) WIDTH (MEV)

W		75.0	9.0	ARMENTERO	67 HBC	C K-P TO SIGMA PI	8/67
W		97.0	30.	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
W		74.0	18.0	BELL	67 HDBC	OKP,KD TO SIG PI	11/67
W		* * * * * * * * *					
W	AVG	76.2910	7.7748	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

56 Y*0(1830) PARTIAL DECAY MODES

P1	Y*0(1830) INTO KBAR N	S11S17
P2	Y*0(1830) INTO SIGMA PI	S20S 8

56 Y*0(1830) BRANCHING RATIOS

R1	Y*0(1830) INTO (KBAR N)/TOTAL			(P1)/TOTAL		
R1	0.08	0.01	ARMENTER1	67 HBC	C K-P ELAST+CH.EX	8/67
R2	Y*0(1830) INTO (SIGMA PI)*(KBAR N)/TOTAL**2			(P2*P1)/TOTAL**2		
R2	0.0225	0.006	ARMENTERO	67 HBC	C K-P TO SIG PI	8/67
R2	0.037	0.003	BELL	67 HDBC	C KP,KD TO SIG PI	11/67
R2	* * * * * * * * *					
R2 AVG	.0341	.0058	AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.2)			

REFERENCES -- Y*0(1830)

ARMENTER	67 PL 24B 196	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE1	67 CERN 67-17 TBP	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
BELL	67 PRL 19 936	R B BELL ////////////////////////////L R L

Δ (1860) $F_{0,7}$

60 Y*0(1860, JP=7/2+) I=0

PARTIAL WAVE ANALYSIS OF ELASTIC AND CHARGE EXCHANGE DATA REQUIRE A RESONANT F07 AMPLITUDE. EXISTENCE NOT CONCLUSIVELY ESTABLISHED.

Y*0(1860) MASS (MEV)

M		1864.0	2.0	ARMENTERO	67 HBC	C K-P EL. +CH.EXC.	11/67

Y*0(1860) WIDTH (MEV)

W		34.0	5.0	ARMENTERO	67 HBC	C K-P EL. +CH.EXC.	11/67

Y*0(1860) PARTIAL DECAY MODES

P1	Y*0(1860) INTO KBAR N	S11S17

Y*0(1860) BRANCHING RATIOS

R1	Y*0(1860) INTO (KBAR N)/TOTAL			(P1)/TOTAL		
R1	0.13	0.02	ARMENTERO	67 HBC	C K-P EL. +CH.EXC.	11/67

REFERENCES -- Y*1(1660)

ARMENTER	67 CERN TC 67-17	ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Λ (2100)

41 Y*0(2100, JP=7/2-) I=0

41 Y*0(2100) MASS (MEV)

M	*	2097.0	6.0		BOCK	65 HBC	PBAR P 5.7 BEV/C	
M	*	2120.0			WOHL	66 HBC	K-P CH EX	
M		2103.0	10.0		KYCIA	67 CNTR	K-P, D TOTAL	8/67

41 Y*0(2100) WIDTH (MEV)

W	*	24.0	14.0	24.0	BOCK	65 HBC	INTO KBAR N (PI)	
W	*	145.0			WOHL	66 HBC		
W		143.0	10.0		KYCIA	67 CNTR		8/67

41 Y*0(2100) PARTIAL DECAY MODES

P1	Y*0(2100) INTO KBAR N	S11S17
P2	Y*0(2100) INTO SIGMA PI	S20S 8
P3	Y*0(2100) INTO LAMBDA ETA	S18S14
P4	Y*0(2100) INTO XI K	S22S11
P5	Y*0(2100) INTO LAMBDA OMEGA	S18U 1
P6	Y*0(2100) INTO KBAR N PI	S11S17S 8

41 Y*0(2100) BRANCHING RATIOS

R1		Y*0(2100) INTO (KBAR N)/TOTAL				(P1)/TOTAL	
R1	*	0.25			WOHL	66 HBC	
R1		0.333	0.013		KYCIA	67 CNTR	8/67
R2		Y*0(2100) INTO (SIGMA PI)*(KBAR N)/TOTAL**2				(P2)*(P1)/TOTAL**2	
R2		0.0145			GALTIERI	67 HBC	K-P TO SIG PI 8/67
R3		Y*0(2100) INTO (LAMBDA ETA)*(KBAR N)/TOTAL**2				(P3)*(P1)/TOTAL**2	
R3		0.0087			FLATTE 2	67 HBC	K-P TO LAM ETA 8/67
R4		Y*0(2100) INTO (XI K)*(KBAR N)/TOTAL**2				(P4)*(P1)/TOTAL**2	
R4		0.0029			TRIPP	67 RVUE	8/67
R5		Y*0(2100) INTO (LAMBDA OMEGA)/TOTAL				(P5)/TOTAL	
R5		0.1	OR LESS		FLATTE 1	67 HBC	8/67
R6		Y*0(2100) INTO (KBAR N PI)/TOTAL				(P6)/TOTAL	
R6		SEEN			BOCK	65 HBC	

REFERENCES -- Y*0(2100)

BOCK	65 PL 17 166	+COOPER,FRENCH,KINSON, + //CERN,SACLAY
WOHL	66 PRL 17 107	C G WOHL, F T SOLMITZ, M L STEVENSON //LRL IJP
KYCIA	67 PRIVATE COMM.	T F KYCIA //BNL I
FLATTE 1	67 PR 155 1517	S M FLATTE //LRL
TRIPP	67 NP B3 10	+ LEITH, + //LRL,SLAC,CERN,HEIDEL,SACLAY
FLATTE 2	67 PR 163	S M FLATTE, C G WOHL //LRL
GALTIERI	67 PRIVATE COMM	L BARBARO-GALTIERI //LRL

PAPER NOT REFERRED TO IN DATA CARDS.

COOL	66 PRL 16 1228	+GIACOMELLI,KYCIA,LEGNTIC,LI,LUNDBY,+//BNL I

-- REPLACED BY KYCIA 67.

Λ (2350)

42 Y*0(2350, JP=) I=0

42 Y*0(2350) MASS (MEV)

M	2352.0	11.0		KYCIA	67 CNTR	K-P, D TOTAL	8/67

42 Y*0(2350) WIDTH (MEV)

W	210.0	50.0		KYCIA	67 CNTR		8/67

42 Y*0(2350) PARTIAL DECAY MODES

P1	Y*0(2350) INTO KBAR N	S11S17

42 Y*0(2350) BRANCHING RATIOS

R1		Y*0(2350) INTO (KBAR N)/TOTAL				(P1)/TOTAL	
	J IS NOT KNOWN. FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL						
R1		0.68	0.10		KYCIA	67 CNTR	8/67

REFERENCES -- Y*0(2350)

KYCIA	67 PRIVATE COMM.	T F KYCIA //BNL I

PAPER NOT REFERRED TO IN DATA CARDS.

COOL	66 PRL 16 1228	+GIACOMELLI,KYCIA,LEGNTIC,LI,LUNDBY,+//BNL I

-- REPLACED BY KYCIA 67.

Σ^+

19 SIGMA + (1189,JP=1/2+) I=1

SEE LISTINGS OF STABLE PARTICLES

Σ^-

20 SIGMA - (1198,JP=1/2+) I=1

SEE LISTINGS OF STABLE PARTICLES

Σ^0

21 SIGMA 0 (1193,JP=1/2+) I=1

SEE LISTINGS OF STABLE PARTICLES

Σ (1385)

43 Y*1(1385, JP=3/2+) I=1 $P_{1,3}$

FOR THE TABLES WE USE ONLY THE UNSTARRED DATA, WHICH ARE ATTEMPTS TO OBTAIN THE SEPARATE CHARGE-STATE MASSES AND WIDTHS. SEE HOWEVER THE IDEOGRAMS INSERTED IN LISTINGS. THESE INDICATE SERIOUS SYSTEMATICS, PERHAPS ARISING FROM INTERFERENCE EFFECTS THAT CHANGE WITH PRODUCTION MECHANISM AND BEAM MOMENTUM.

43 Y*1(1385) MASS (MEV)

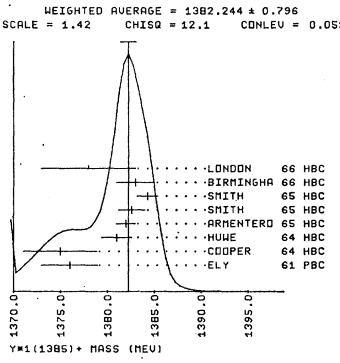
M	*	141	1384.0		ALSTON	60 HBC	+- K-P 1.15 BEV/C	
M	*	38	1384.0		MARTIN	61 HBC	O+ K20 P .98 BEV/C	
M	*		1385.0		BERGE	61 HBC	+- K-P .4-.85 BEV/C	
M	*		1392.0	7.0	COLLEY	62 PBC	O- PI- PRP 2. BEV/C	
MO	*	106	1381.0	4.0	CURTIS	63 SPRK	O PI-P 1.5 BEV/C	
M	*		1392.0	10.0	MUSGRAVE	65 HBC	+-OPBAR P 3-4 BEV/C	
M	*		1389.0	3.0	BALTAY	65 HBC	+- PBAR P 3.7 BEV/C	
M+		154	1376.0	3.0	ELY	61 PBC	+ K-P 1.11 BEV/C	
M+		170	1375.0	3.9	COOPER	64 HBC	+ K-P 1.45 BEV/C	
M+		859	1381.0	1.6	HUWE	64 HBC	+ K-P 1.22 BEV/C	
M+			1382.0	1.0	ARMENTERO	65 HBC	+ K-P .9-1.2 BEV/C	
M+			1382.6	1.4	SMITH	65 HBC	+ K-P 1.95 BEV/C	
M+			1384.3	1.1	SMITH	65 HBC	+ K-P 1.8 BEV/C	
M+		40	1383.0	2.0	BIRMINGHA	66 HBC	+ 3.5 K- P	9/67
M+			1376.0	5.0	LONDON	66 HBC	+ K-P 2.24 BEV/C	
M+			* * * * * * * *					
M+	AVG		1382.2440	.7961	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)			
			(SEE IDEOGRAM)					
M-		93	1382.0	3.0	DAHL	61 DBC	- K-D 0.45 BEV/C	
M-		224	1376.0	3.0	ELY	61 PBC	-	
M-		200	1392.0	6.2	COOPER	64 HBC	-	
M-		1086	1385.3	1.5	HUWE	64 HBC	-	
M-			1364.0	1.0	ARMENTERO	65 HBC	-	
M-			1391.5	1.6	SMITH	65 HBC	- K-P 1.8 BEV/C	
M-			1399.8	1.4	SMITH	65 HBC	- K-P 1.95 BEV/C	
M-			1389.0	9.0	LONDON	66 HBC	-	
M-			* * * * * * * *					
M-	AVG		1388.0068	3.0064	AVERAGE (ERROR INCLUDES SCALE FACTOR = 4.6)			
			(SEE IDEOGRAM)					

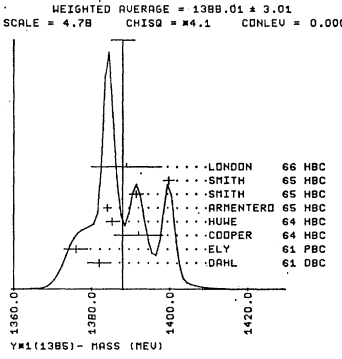
43 Y*(-) - Y*(+) MASS DIFFERENCE (MEV)

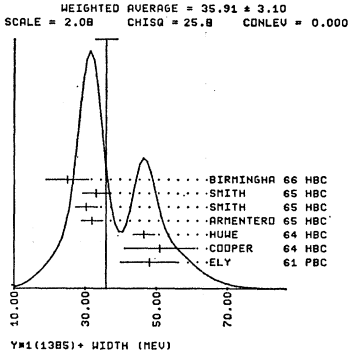
D	R		0.0	4.2	ELY	61 PBC	+- K-P 1.11 BEV/C	
D	R		4.3	2.2	HUWE	64 HBC	+- K-P 1.22 BEV/C	
D	R		2.0	1.5	ARMENTERO	65 HBC	+- K-P .9-1.2 BEV/C	
D	R		7.2	2.1	SMITH	65 HBC	+- K-P 1.8 BEV/C	
D	R		17.2	2.6	SMITH	65 HBC	+- K-P 1.95 BEV/C	
	R	REDUNDANT WITH DATA IN MASS LISTING.						
D	R		11.0	9.0	LONDON	66 HBC	+- K-P 2.24 BEV/C	
D			9.0	6.0	LONDON	66 HBC	+- LAMBDA 3 PI EVTS	

43 Y*1(1385) WIDTH (MEV)

W	*		64.0		ALSTON	60 HBC	+-	
W	*		20.0	OR LESS	MARTIN	61 HBC	O+	
W	*		40.0		BERGE	61 HBC	+-	
W	*		80.0	10.0	COLLEY	62 PBC	O-	
W	*		30.0	9.0	CURTIS	63 SPRK	O	
W	*		38.0	9.0	MUSGRAVE	65 HBC	+-O	
W	*		26.0	5.0	BALTAY	65 HBC	+-	
W+			48.0	8.0	ELY	61 PBC	+	
W+			51.0	10.0	COOPER	64 HBC	+	
W+			46.5	3.0	HUWE	64 HBC	+	
W+			32.0	3.0	ARMENTERO	65 HBC	+	
W+			30.3	3.1	SMITH	65 HBC	+ K-P 1.8 BEV/C	
W+			33.1	3.8	SMITH	65 HBC	+ K-P 1.95 BEV/C	
W+		40	25.0	6.0	BIRMINGHA	66 HBC	+ 3.5 K- P	9/67
W+			* * * * * * * *					
W+	AVG		35.9114	3.0978	AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.1)			
			(SEE IDEOGRAM)					
W-			40.0		DAHL	61 DBC	-	
W-			66.0	10.0	ELY	61 PBC	-	
W-			68.0	10.0	COOPER	64 HBC	-	
W-			62.0	7.0	HUWE	64 HBC	-	
W-			36.0	3.0	ARMENTERO	65 HBC	-	
W-			29.2	5.7	SMITH	65 HBC	- K-P 1.80 BEV/C	
W-			17.1	4.4	SMITH	65 HBC	- K-P 1.95 BEV/C	
W-			* * * * * * * *					
W-	AVG		37.6555	7.7088	AVERAGE (ERROR INCLUDES SCALE FACTOR = 3.7)			
			(SEE IDEOGRAM)					







ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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----------------  43  Y*1(1385) PARTIAL DECAY MODES  ----------------------

P1          Y*1(1385) INTO LAMBDA PI                          S18S 8
P2          Y*1(1385) INTO SIGMA PI                           S20S 8

----------------  43  Y*1(1385) BRANCHING RATIOS  ------------------------

R1          Y*1(1385) INTO (SIGMA PI)/(LAMBDA PI)       (P2)/(P1)
R1             0.04      0.04          BASTIEN   61 HBC  +-
R1  *          0.04       OR LESS      ALSTON    62 HBC  +-0
R1             0.05      0.04          HUWE      64 HBC  +-
R1             0.163     0.035         ARMENTERO 65 HBC  +-
R1             0.06      0.06          LONDON    66 HBC  +
R1          . . . . . . . . .
R1  AVG        .1009     .0284   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.4)
                        (SEE IDEOGRAM)

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                        REFERENCES -- Y*1(1385)

ALSTON    60 PRL 5 520          +ALVAREZ,EBERHARD,GUOD,GRAZIANO, +   //LRL  I
DAHL      61 PRL 6 142          +HORWITZ,MILLER,MURRAY,WHITE         //LRL
MARTIN    61 PRL 6 283          +LEIPUNER,CHINOWSKY,SHIVELY, +  //BNL,YALE
BERGE     61 PRL 6 557          +BASTIEN,DAHL,FERRO-LUZZI,KIRZ, +    //LRL
BASTIEN   61 PRL 6 702          P BASTIEN,M FERRO-LUZZI,A H ROSENFELD//LRL
ELY       61 PRL 7 461          +FUNG,GIDAL,PAN,POWELL,WHITE         //LRL  J
ALSTON    62 CERN CONF 311      +ALVAREZ,FERRO-LUZZI,ROSENFELD, +    //LRL
COLLEY    62 PR 126 1930        +GELFAND,NAUENBERG, +   //COLUMBIA,RUTGERS  JP
CURTIS    63 PR 132 1771        +COFFIN,MEYER,TERWILLIGER            //MICH  J
COOPER    64 PL 8 365           +FILTHUTH,FRIDMAN,MALAMUD, +  //CERN,AMSTR
HUWE      64 UCRL-11291 THESIS D O HUWE ////////////////////////// //LRL  JP
MUSGRAVE  65 NC 35 735          +PETMEZAS,+//BIRMGHM,CERN,EP,IMPCOL,SACLAY
ARMENTER  65 PL 19 75           ARMENTEROS, +          //CERN,HEIDEL,SACLAY
BALTAY    65 PR 140 B1027       +SANDWEISS,TAFT,COLWICK,KCPP, + //YALE,BNL
SMITH     65 THESIS (UCLA)      L T SMITH//////////////////////////////UCLA
BIRMINGH  66 PR  152  1146      BIRMINGHAM,GLASGOW,I.C., OXFORDYRUTHERFORD
LONDON    66 PR 143 1034        +RAU,SAMIOS,YAMAMOTO,GOLDBERG,+ //BNL,SYCR  J

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS.

SHAFER    64 PR 134 B1372       J B SHAFER, D O HUWE                 //LRL  JP
MALAMUD   64 PL 10 145          E MALAMUD, P E SCHLEIN          //CERN,UCLA  JP

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Σ (1660)

44 Y*1(1660, JP=3/2-) I=1 $D_{1,3}$

THE Y*1(1660) HAS APPEARED IN BOTH FORMATION AND PRODUCTION EXPERIMENTS. THE PRESENT DATA ON FORMATION EXPERIMENTS IS NOT SUFFICENT TO CLARIFY THE SITUATION OF THE I=1 STATE. PRODUCTION EXPERIMENTS HAVE SHOWN LARGE INCONSISTENCIES IN THE BRANCHING RATIOS (CHANGING WITH INCIDENT ENERGY). THE Y*(1690) MIGHT BE A SECOND I=1 STATE IN THIS ENERGY REGION. BRANCHING RATIOS HOWEVER ARE NOT YET DISENTANGLED.

AS FOR THE QUANTUM NUMBERS, THE ANALYSES OF LAMBDA PI CHANNEL (IN FORMATION EXP.) AND Y*0(1405)+PI CHANNEL (IN PROD. EXP.) ARE CONSISTENT WITH JP=3/2-. JP OF Y*1(1690) NOT YET KNOWN.

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----------------  44  Y*1(1660) MASS (MEV)  ------------------------------

M           1685.0                    ALEXANDER 62 HBC  0- PI-P 2-2.2 BEV/C
M           1660.0     10.0           ALVAREZ   63 HBC  +  K-P 1.51 BEV/C
M           1660.0                    BERLEY    64 HBC  C  K-P TO LAM PIO
M           1645.0      7.0           LEVEQUE   65 HBC  +  K-P TO Y*1660 PI
M           1662.0      5.0           DAVIES    67 CNTR    K-P, D TOTAL C.S
M           1665.0      3.0           ARMENTERO 67 HBC  C K-P TO SIGMA PI   8/67
M           . . . . . . . . .
M  AVG      1661.8149   3.5678  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)
                        (SEE IDEOGRAM)

----------------  44  Y*1(1660) WIDTH (MEV)  ------------------------------

W           45.0                      ALEXANDER 62 HBC  C-
W           40.0      10.0            ALVAREZ   63 HBC  +
W           60.0                      BERLEY    64 HBC  C
W           55.0      10.0            LEVEQUE   65 HBC  +
W           45.0      15.0            DAVIES    67 CNTR                    11/66
W           32.0       4.0            ARMENTERO 67 HBC  C K-P TO SIGMA PI   8/67
W  C        46.0       7.             ARMENTER1 67 HBC    OK-P EL. +CH.EXC. 11/67
W  C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
W           . . . . . . . . .
W  AVG      36.2300   4.4328  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
                        (SEE IDEOGRAM)

----------------  44  Y*1(1660) PARTIAL DECAY MODES  ----------------------

P1          Y*1(1660) INTO KBAR N                             S11S17
P2          Y*1(1660) INTO LAMBDA PI                          S18S 8
P3          Y*1(1660) INTO SIGMA PI                           S20S 8
P4          Y*1(1660) INTO LAMBDA PI PI                       S18S 8S 8
P5          Y*1(1660) INTO SIGMA PI PI                        S20S 8S 8
P6          Y*1(1660) INTO Y*1(1385) PI                       U43S 8
P7          Y*1(1660) INTO Y*0(1405) PI                       U37S 8

----------------  44  Y*1(1660) BRANCHING RATIOS  ------------------------

R1          Y*1(1660) INTO (KBAR N)/TOTAL                 (P1)/TOTAL
R1             0.05       OR LESS      ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R1  B          0.16       OR MORE      BASTIEN 2 63 HBC  C
R1  B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)                11/67
R1             0.2        OR LESS      LONDON    66 HBC  + K-P AT 2.25 BEV/C
R1  C          0.06       0.03         ARMENTER1 67 HBC  O K-P EL. +CH.EXC.  11/67
R1  C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
R1             0.065                   DAVIES    67 CNTR C  ASSUMING J=3/2   11/66

R2          Y*1(1660) INTO (LAMBDA PI)/TOTAL              (P2)/TOTAL
R2             0.32                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R2  B          0.05       OR LESS      BASTIEN 2 63 HBC  O K-P TO LAM. PI
R2  B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)                11/67
R2             0.2        OR LESS      LONDON    66 HBC  + K-P AT 2.25 BEV/C
R2             0.06       0.06         SMART     66 DBC  -  ASSUMING R1=0.15
R2             0.45                    ARMENTERO 66 HBC  C  ASSUMING R1=0.15

R3          Y*1(1660) INTO (SIGMA PI)/TOTAL               (P3)/TOTAL
R3             0.27                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R3  B          0.22       0.06         BASTIEN 2 63 HBC  C K-P TO SIGMA PI
R3  B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)                11/67
R3             0.25       0.15         LONDON    66 HBC  + K-P AT 2.25 BEV/C
R3             0.67       0.10         ARMENTERO 67 HBC    C ASSUMING R1=0.10  8/67
R3          . . . . . . . . .
R3  AVG        .5406      .1938  AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.3)

R4          Y*1(1660) INTO (LAMBDA PI PI)/TOTAL           (P4)/TOTAL
R4             0.16                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R4  B          0.16       0.05         BASTIEN 2 63 HBL  C
R4  B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)                11/67
R4             0.2        OR LESS      LONDON    66 HBC  + K-P AT 2.25 BEV/C

R5          Y*1(1660) INTO (SIGMA PI PI)/TOTAL            (P5)/TOTAL
R5             0.18                    ALVAREZ   63 HBC  + K-P AT 1.15 BEV/C
R5  B          0.25       0.06         BASTIEN 2 63 HBC  C K-P TO SIG PI PI
R5  B  ANALYSIS DID NOT INCLUDE I=0 RESONANT STATE Y*0(1690)                11/67

R6          Y*1(1660) INTO (Y*0(1405) PI)/TOTAL           (P7)/TOTAL
R6             0.75       0.25         LONDON    66 HBC  + K-P AT 2.25 BEV/C

R7          Y*1(1660) INTO (KBAR N)/(LAMBDA PI)           (P1)/(P2)
R7             0.43       OR MORE      SMITH     63 HBC  O-
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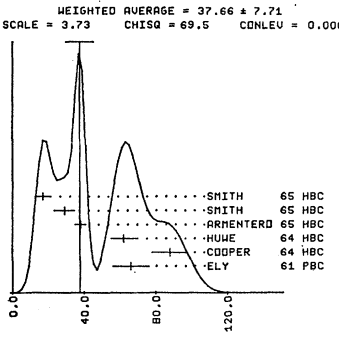

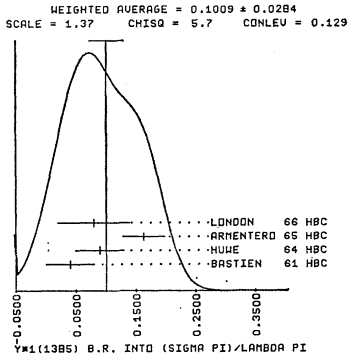

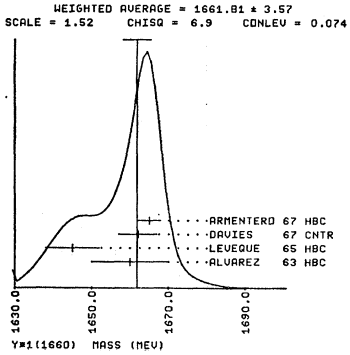

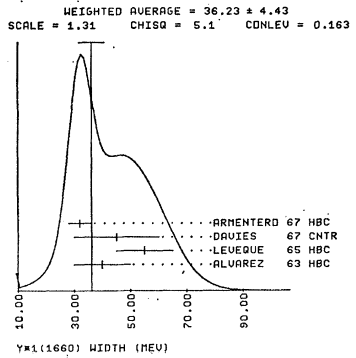

ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

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R8          Y*1(1660) INTO (SIGMA PI)/(LAMBDA PI)          (P3)/(P2)
R8             0.86                    SMITH      63 HBC  C-
R8             6.8       3.0           HUWE       64 HBC  +

R9          Y*1(1660) INTO (LAMBDA PI PI)/(LAMBDA PI)      (P4)/(P2)
R9             0.14                    SMITH      63 HBC  C-

R10         Y*1(1660) INTO (Y*0(1405) PI)/(SIGMA PI PI)    (P7)/(P5)
R10            0.9C      0.10     0.16  EBERHARD   65      + K-P AT 2.45 BEV/C

R11         Y*1(1660) INTO (Y*0(1405) PI)/(Y*1(1385) PI)   (P7)/(P6)
R11            0.8       OR MORE       EBERHARC   65      +

R12     Y*1(1660) IN  (LAMBDA PI PI)/(SIGMA PI PI)         (P4)/(P5)
R12            0.35      0.2           BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67

R13     Y*1(1660) INTO (LAMBDA PI)/(SIGMA PI PI)           (P2)/(P5)
R13            .2    OR LESS           BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67

R14     Y*1(1660) INTO (SIGMA PI)/(SIGMA PI PI)            (P3)/(P5)
R14            .4    OR LESS           BIRMINGHA 66 HBC  +  K-P AT 3.5 GEV/C 11/67

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                              REFERENCES -- Y*1(1660)

ALEXANDE 62 CERN CONF 320     ALEXANDER,JACOBS,KALBFLEISCH,MILLER,+//LRL  I
ALVAREZ  63 PRL 10 184        +ALSTON,FERRO-LUZZI,HUWE, +          //LRL  I
BASTIEN2 63 UCRL-10779 THESIS P L BASTIEN                          //LRL  IJ
SMITH    63 ATHENS CONF 67    G A SMITH                           //LRL
HUWE     64 UCRL-11291 THESIS D O HUWE                            //LRL
BERLEY   64 DUBNA CONF I 565  +CONNOLLY,HART,RAHM,STONEHILL, +     //BNL IJP
EBERHARD 65 PRL 14 466        +SHIVELY,ROSS,SIEGAL,FICENEC, +  //LRL,ILL  I
LEVEQUE  65 PL 18 69           +    //SACLAY,EP,GLASGOW,IMPCOL,OXF,RTHFD  JP
LONDON   66 PR 143 1034       +RAU,SAMIOS,YAMAMOTO,GOLDBERG,+ //BNL,SYCR  IJ
SMART    66 PRL 17 556        W M SMART,A KERNAN,G E KALMUS,R P ELY//LRL IJP
ARMENTER 66 BERKELEY CONF     ARMENTEROS,F-LUZZI, + //CERN,HEIDEL,SACLAY IJP
BIRMINGH 66 PR  152  1148     BIRMINGHAM,GLASGOW,I.C.Y OXFORDYRUOHERFORD
ARMENTER 67 PL 24B 198        ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY JP
ARMENTE1 67 CERN TC 67-17     ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
DAVIES   67 PRL 18 62         +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH

                         PAPERS NOT REFERRED TO IN DATA CARDS.

BASTIEN1 63 PRL 10 188        P L BASTIEN, J P BERGE               //LRL  IJ
   --  REPLACED BY BASTIEN 2, BUT SIMILAR AND MORE READILY AVAILABLE.
T-ZADEH  63 PRL 11 470        TAHER-ZADEH,PROWSE,SCHLEIN,SLATER,+ //UCLA  JP
   --  SEE NOTE FOLLOWING SCHLEIN 66.
SLATER   65 BAPS 10 1196      +CAUBER, SCHLEIN, STORK, TICHO       //UCLA  JP
LEE      66 PRL 17 45         Y Y LEE, D D REEDER, R W HARTUNG     //WISC  JP
SCHLEIN  66 UCLA-1016         P E SCHLEIN, T G TRIPPE              //UCLA  JP
   --  REANALYZES DATA OF TAHER-ZADEH 63 AND BASTIEN 63 AND ALL PUBLISHED
       LAMBDA PI CROSS SECTION DATA IN THE LIGHT OF THE NOW KNOWN
       Y*1(1765) AND REVERSES THE MODEL-DEPENDENT CONCLUSION OF TAHER-
       ZADEH ON THE PREFERRED JP ASSIGNMENT (FROM 3/2+ TO 3/2-).
EBERHARD 67 PREPRINT          +PRIPSTEIN,SHIVELY,KRUSE,SWANSON //LRL,ILL IJP

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Σ (1690)

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                              U56  Y*1(1690, JP=    ) I=1
                              SEE NOTE PRECEDING Y*1(1660) LISTINGS

                              U58  Y*1(1690) MASS (MEV)

M       30 1715.0     12.0            COLLEY    67 HBC  +  K-P AT 6.0 GEV/C  8/67
M       53 1683.0     15.0            DERRICK   67 HBC  +  K-P AT 5.5 GEV/C  8/67
        * * * * * * * * *
M   AVG     1702.5122 15.6098   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.7)

                              U58  Y*1(1690) WIDTH (MEV)

W       30  100.0     35.0            COLLEY    67 HBC  +  K-P AT 6.0 GEV/C  8/67
W       53  120.      30.             DERRICK   67 HBC  +  K-P AT 5.5 GEV/C  8/67
W       * * * * * * * * * *
W   AVG     111.5294  22.7777   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)

                              U58  Y*1(1690) PARTIAL DECAY MODES

P1    Y*1(1690) INTO KBAR N                                    S11S17
P2    Y*1(1690) INTO LAMBDA PI                                 S18S 9
P3    Y*1(1690) INTO SIGMA  PI                                 S20S 8
P4    Y*1(1690) INTO Y*1(1385) PI                              U43S 8

                              U58  Y*1(1690) BRANCHING RATIOS

R1    Y*1(1690) INTO (LAMBDA PI)/(KBAR N)                      (P2)/(P1)
R1      16    0.80      0.50            COLLEY    67 HBC  +  KO BAR FIN.STATE  8/67
R1      15    0.6       0.40            DERRICK   67 HBC  +  KO BAR FIN.STATE  8/67
R1      * * * * * * * * *
R1  AVG       .6780     .3123   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)

R2    Y*1(1690) INTO (SIGMA PI)/(LAMBDA PI)                    (P3)/(P2)
R2            0.3       0.3             COLLEY    67 HBC  +  CHARG.SIGMA F.S.  8/67
R2            0.25   OR LESS            DERRICK   67 HBC  +  NEUTR. SIGMA F.S  8/67

R3    Y*1(1690) INTO (Y*1(1385) PI)/(LAMBDA PI)                (P4)/(P2)
R3      14    1.0       0.3             DERRICK   67 HBC  +  LAMBDA 2PI F.S.   8/67
R3            0.49      0.29            COLLEY    67 HBC  +  LAMBDA 2PI F.S.   8/67
R3      * * * * * * * * *
R3  AVG       .7364     .2549   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.2)

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                              REFERENCES -- Y*1(1690)

COLLEY   67 PL 24B 489        +MACDONALD,MUSGRAVE+/EI,LG,IC,MPI,OXF,RUTH
DERRICK  67 PRL 18 266        +FIELDS,LOKEN,AMMAR,DAVIS//ARGONNE,NORTHWE

                         PAPERS NOT REFERRED TO IN DATA CARDS

MEYER    67 HEIDELBERG CONF.  J MEYER - RAPPORTEUR ON BARYON RES./SACLAY

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Σ (1765)

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                              45  Y*1(1765, JP=5/2-) I=1    D15

                              45  Y*1(1765) MASS (MEV)    ------------------------------

M           1765.0     10.0            GALTIERI  63 DBC  C  K-D 1.51 BEV/C
M           1755.0     10.0            ARMENTERO 65 HBC  C  K-P TO Y*1520 PI
M           1760.0     10.0            BELL 1,2  66 DBC  -  K-N TO Y*1520 PI
M           1746.0      8.0            FENSTER   66 HBC  O  K-P TO Y*1520 PI
M   N       1758.0     11.0            GELFAND   66 HDC  O BGD PURE IMAG     8/67
M   N       1756.0     11.0            LEVI SETT 66 RVUE    SOME REAL BGD
M   N       RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 67 FITS TOO.
M           1776.0      6.0            SMART     66 DBC  -  K-N TO LAM PI-
M           1766.0      4.0            ARMENTER1 67 HBC  O K-P ELAST+CH.EX   8/67
M           1775.0      5.0            DAVIES    67 CNTR    K-P, D TCTAL     11/66
M           * * * * * * * * *
M   AVG     1766.8259   3.6065   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.5)

------------------  45  Y*1(1765) WIDTH (MEV)  ------------------------------

W            60.0      10.0            GALTIERI  63 DBC  C
W            70.0      20.0            BELL 2    66 DBC  -
W           129.0      16.0            SMART     66 DBC  -
W            70.0      20.0            FENSTER   66 HBC  O
W   N       113.0      25.0            LEVI SETT 66 RVUE    SOME REAL BGD
W   N       113.0      25.0            GELFAND   66 HBC  O BGD PURE IMAG     8/67
W   N       RES + DIFFRACTIVE BGD FO- K-P ELC  DATA A-E +- A-MENT 67 ++TSOOO+=
W            114.0      8.0            ARMENTER1 67 HBC  C K-P ELAST+CH.EX    8/67
W            120.0     50.0            DAVIES    67 CNTR                    11/66
W           * * * * * * * * *
W   AVG      93.9691  13.5027   AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.5)

------------------  45  Y*1(1765) PARTIAL DECAY MODES  ----------------------

P1          Y*1(1765) INTO KBAR N                                S11S17
P2          Y*1(1765) INTO LAMBDA PI                             S18S 9
P3          Y*1(1765) INTO SIGMA PI                              S20S 8
P4          Y*1(1765) INTO SIGMA ETA                             S21S14
P5          Y*1(1765) INTO Y*1(1385) PI                          U43S 8
P6          Y*1(1765) INTO Y*0(1520) PI                          U38S 8

P1          Y*1(1765) INTO KBAR N                                S11S17
P2          Y*1(1765) INTO LAMBDA PI                             S18S 9
P3          Y1*(1765) INTO Y*0(1520) PI                          U38S11
P4          Y*1(1765) INTO Y*1(1385) PI                          U43S 8
P5          Y*1(1765) INTO SIGMA PI                              S20S 8
P6          Y*1(1765) INTO SIGMA ETA                             S21S14

------------------  45  Y*1(1765) BRANCHING RATIOS  ----------------------

R1    Y*1(1765) INTO (KBAR N)/TOTAL                            (P11)/TOTAL
R1  *         0.6                   GALTIERI  63 HBC  O  K-P RVUE
R1  N         0.46      0.05        GELFAND   66 HBC  O BGD PURE IMAG     8/67
R1  N         0.46      0.05        LEVI SETT 66 RVUE    SOME REAL BGD
R1  N       RES + DIFFRACTIVE BGD FOR K-P EL.  DATA ARE IN ARMENT 67 FITS TOO.
R1            0.34                  KYCIA     67 CNTR    TOTAL CRCSS-SEC.  8/67
R1            0.53      0.09        UHLIG     67 HBC  C
R1            0.45      0.02        ARMENTER1 67 HBC  C K-P ELAST+CH.EX    8/67
R1            0.43                  DAVIES    67 CNTR                    11/66
R1          * * * * * * * * *
R1  AVG        .4338     .0195   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R1  FIT        .466      .017    VALUE FROM CONSTRAINED FIT

R2    Y*1(1765) INTO (LAMBDA PI)*(KBAR N)/TOTAL**2            (P2*P1)/TOTAL**2
R2            0.090     0.025           ARMENTERO 66 HBC   O
R2            0.07      0.01            SMART     66 DBC   -
R2          * * * * * * * * *
R2  AVG        .0728     .0093   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)
R2  FIT        .072      .007    VALUE FROM CONSTRAINED FIT

R3    Y*1(1765) INTO (Y*0(1520) PI)*(KBAR N)/TOTAL**2   (P3*P1)/TOTAL**2
R3            0.075     0.015           ARMENTERO 66 HBC   OMYPERONS FIN.ST.
R3            0.12      0.03            FENSTER   66 HBC   OKBAR N  FIN. ST.
R3          * * * * * * * * *
R3  AVG        .0840     .0180   AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.3)
R3  FIT        .070      .010    VALUE FROM CONSTRAINED FIT

R4    Y*1(1765) INTO (Y*1(1385) PI)*(KBAR N)/TOTAL**2   (P4*P1)/TOTAL**2
R4            0.09      0.03            ARMENTER2 67 HDC   O K-P TO LAM.PI PI  8/67
R4          * * * * * * * * *
R4  FIT        .065      .017    VALUE FROM CONSTRAINED FIT

R5    Y*1(1765) INTO (SIGMA PI)*(KBAR N)/TOTAL **2      (P5*P1)/TOTAL**2
R5            0.005     0.003           ARMENTERO 67 HBC   C K-P TO SIGMA PI   8/67
R5          * * * * * * * * *
R5  FIT        .005      .003    VALUE FROM CONSTRAINED FIT

R6    Y*1(1765) INTO (LAMBDA PI)/(KBAR N)                      (P2)/(P1)
R6            0.33      0.05            UHLIG     67 HBC   C K-P,.9 GEV/C
R6          * * * * * * * * *
R6  FIT        .333      .036    VALUE FROM CONSTRAINED FIT

R7    Y*1(1765) INTO (Y*0(1520)/(KBAR N)                       (P3)/(P1)
R7            0.28      0.05            UHLIG     67 HBC   O K-P,.9 GEV/C
R7          * * * * * * * * *
R7  FIT        .322      .043    VALUE FROM CONSTRAINED FIT

R8    Y*1(1765) INTO (Y*1(1385)/(KBAR N)                       (P4)/(P1)
R8            0.25      0.09            UHLIG     67 HBC   O K-P,.9 GEV/C
R8          * * * * * * * * *
R8  FIT        .299      .076    VALUE FROM CONSTRAINED FIT

R9    Y*1(1765) INTO(SIGMA ETA)/TOTAL                          (P6)/TOTAL
R9            0.02        APPROX        ARMENTERO 66 HDC  C-
R9

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                              REFERENCES -- Y*1(1765)

GALTIERI 63 PL 6 296          A BARBARO-GALTIERI,A HUSSAIN,RD TRIPP//LRL IJ
ARMENTER 65 PL 19 338         ARMENTEROS, +      //CERN,HEIDELBERG,SACLAY IJP
BELL 1   66 PRL 16 203        R B BELL, R W BIRGE, Y-L PAN, R T PU //LRL IJP
BELL 2   66 UCRL-16934 THESIS R B BELL                             //LRL IJP
FENSTER  66 PRL 17 641        +GELFAND,HAKMSEN,L-SETTI,+ //CHI,ARG(CERN) IJP
GELFAND  66 PRL 17 1224       +HAKMSEN,LEVI-SETTI,PREDAZZI+//EFINS,ARGON
LEVI SET 66 BERKELEY CONF     R LEVI SETTI, E PREDAZZI             //CHI
SMART    66 PRL 17 556        W M SMART,A KERNAN,G E KALMUS,R P ELY//LRL IJP

KYCIA    67 PRIVATE COMM.     T F KYCIA                            //BNL  I
ARMENTER 67 PL 24B 198        ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE1 67  CERN 67-17 TBP   ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAYIJP
ARMENTE2 67 ZEIT.PHYS.202,486 ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
DAVIES   67 PRL 18 62         +COWELL,HATTERSLEY,HOMER+//BIRMI,CAMB,RUTH
UHLIG    67 PR 155 1448       +CHARLTON,CONDON,GLASSER,YODH,+///MD,USNRL

                         PAPERS NOT REFERRED TO IN DATA CARDS.

YODH     65 ATHENS CONF 269   G B YODH                          //MARYLAND IJ
BIRGE    65 ATHENS CONF 296   +ELY,KALMUS,KERNAN,LOUIE,SAHOURIA, + //LRL IJP
   --  YODH 65 AND BIRGE 65 ARE PRECURSORS OF UHLIG 66 AND BELL 66.
ARMENTER 66  BERKELEY CONF.   ARMENTEROS,FERRO-LUZZI+//CERN,HEID.,SACLAY

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Σ (1780)

```
                              57  Y*1(1780, JP=    ) I=1
                              SIGMA ETA THRESHOLD EFFECT.  INTERPRETATION AS RESONANCE
                              NOT CONCLUSIVE.  SEE FERRO-LUZZI 66.  OMITTED FROM TABLE

------------------  57  Y*1(1780) MASS (MEV)  ------------------------------

M           1780.0                  CLINE     66 DBC  -  K-N TO SIG- ETA

------------------  57  Y*1(1780) WIDTH (MEV)  ------------------------------

W            100.0                  CLINE     66 DBC  -

------------------  57  Y*1(1780) PARTIAL DECAY MODES  ----------------------

P1          Y*1(1780) INTO KBAR N                                S11S17
P2          Y*1(1780) INTO SIGMA ETA                             S20S14

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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

REFERENCES -- Y*1(1780)

```
FERRO-LU 66 BERKELEY 183      ARMENTEROS+FERRO-LUZZI+//CERN,HEIDE,SACLAY
CLINE    67 PL 25B 41         CLINE,OLSSON//////////////////////WISCNSIN

                PAPERS NOT REFERRED TO IN DATA CARDS

MEYER    67 HEIDELBERG CONF.  J MEYER - RAPPORTEUR ON BARYON RES./SACLAY

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```

Σ(1915)

46 Y*1(1915, JP=5/2+) I=1 FIS

PERHAPS SOME SLIGHT RESERVATION SHOULD BE HELD AGAINST COMPLETE ACCEPTANCE OF THE INTERPRETATION OF THIS EFFECT AS (1) BEING A RESONANCE (2) HAVING JP = 5/2+.

46 Y*1(1915) MASS (MEV)

```
M   *     1942.0      9.0            BOCK      65 HBC     PBAR P 5.7 BEV/C
M         1915.0     20.0            COOL      66 CNTR C- K-P, D TCTAL
M         1905.0      5.0            DAVIES    66 CNTR    K-P, D TCTAL      11/66
M         * . * . * . * . *
M   AVG   1905.5682   4.8567  AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.6)
```

46 Y*1(1915) WIDTH (MEV)

```
W   *      36.0     20.0     36.0  BOCK      65 HBC
W          65.0                    COOL      66 CNTR C-
W          60.0     20.0           DAVIES    66 CNTR                     11/66
W   C      50.0     20.0           ARMENTER1 67 HBC     OK-P EL. +CH.EXC. 11/67
W   C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
```

46 Y*1(1915) PARTIAL DECAY MODES

```
P1        Y*1(1915) INTO KBAR N                          S11S17
P2        Y*1(1915) INTO LAMBDA PI                       S18S 8
P3        Y*1(1915) INTO SIGMA PI                        S20S 8
```

46 Y*1(1915) BRANCHING RATIOS

```
R1        Y*1(1915) INTO (KBAR N)/TOTAL                  (P1)/TOTAL
R1           0.103                  COOL      66 CNTR    ASSUMING J=5/2
R1           0.09                   KYCIA     67 CNTR    TOTAL CROSS-SEC.  8/67
R1   *       0.1                    DAVIES    66 CNTR    ASSUMING J=5/2    11/66
R1   C       0.12       .01         ARMENTER1 67 HBC   0 K-P EL. +CH.EXC.  11/67
R1   C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67

R2     Y*1(1915) INTO (LAMBDA PI)*(KBAR N)/TOTAL**2     (P1*P2)/TOTAL**2
R2   C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67
R2           0.012      .006           SMART     66 HBC   C  K-P TO LAM.PI    11/67
R2   C       0.006                     ARMENTER1 67 HBC     OK-P TO LAM.PI    11/67

R3     Y*1(1915) INTO (SIGMA PI)*(KBAR N)/TOTAL**2      (P1*P3)/TOTAL**2
R3   C       0.00       0.01           ARMENTERO 67 HBC     K-P TO SIG+-PI-+  11/67
R3   C LACK OF DATA PREVENTS AUTHORS FROM DETERMINING UNAMBIG  THIS AMPLITU. 11/67

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```

REFERENCES -- Y*1(1915)

```
BOCK     65 PL 17 166          +COOPER,FRENCH,KINSON, +      //CERN,SACLAY  I
COOL     66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
SMART    66 PRL 17 556         W M SMART,A KERMAN,G E KALMUS,R P ELY//LRL IJP
ARMENTER 67 PL 24B 191         ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
ARMENTE1 67 CERN TO 67-17      ARMENTEROS,FERRO-LUZZI+///CERN,HEID,SACLAY
DAVIES   67 PRL 18 62          +COWELL,HATTERSLEY,MOMER+//BIRMI,CAMB,RUTH  I
KYCIA    67 PRIVATE COMM.      T F KYCIA                          //BNL  I

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```

Σ(2030)

47 Y*1(2030, JP=7/2+) I=1

47 Y*1(2030) MASS (MEV)

```
M   *     2022.0     20.0            BLANPIED  65 CNTR C  GAMMA P TO K+ Y*
M   *     2036.0     20.0            WOHL      66 HBC  C  K-P TO LAM PIO
M         2026.0     19.0            KYCIA     67 CNTR    K-P, D TCTAL      8/67
```

47 Y*1(2030) WIDTH (MEV)

```
W   *      120.0     20.0            BLANPIED  65 CNTR C
W   *      170.0                     WOHL      66 HBC  C
W          120.0     10.0            KYCIA     67 CNTR                     8/67
```

47 Y*1(2030) PARTIAL DECAY MODES

```
P1        Y*1(2030) INTO KBAR N                          S11S17
P2        Y*1(2030) INTO LAMBDA PI                       S18S 9
P3        Y*1(2030) INTO SIGMA PI                        S20S 8
P4        Y*1(2030) INTO XI K                            S22S11
```

47 Y*1(2030) BRANCHING RATIOS

```
R1        Y*1(2030) INTO (KBAR N)/TOTAL                  (P1)/TOTAL
R1   *       0.25                   WOHL      66 HBC  0  K-P CH EX
R1           0.105      0.005       KYCIA     67 CNTR                     8/67

R2     Y*1(2030) INTO (LAMBDA PI)*(KBAR N)/TOTAL**2     (P2)*(P1)/TOTAL**2
R2           0.040                  WOHL      66 HBC     K-P TO LAM PIO

R3     Y*1(2030) INTO (SIGMA PI)*(KBAR N)/TOTAL**2      (P3)*(P1)/TOTAL**2
R3           0.0096                 GALTIERI  67 HBC     K-P TO SIG PI     8/67

R4     Y*1(2030) INTO (XI K)*(KBAR N)/TOTAL**2          (P4)*(P1)/TOTAL**2
R4           0.00256  OR LESS       TRIPP     67 RVUE                     8/67

****** ********* ********* ********* ********* ********* ********* *********
```

REFERENCES -- Y*1(2030)

```
BLANPIED 65 PRL 14 741         +GREENBERG,HUGHES,KITCHING,LU,+//YALE(CEA)
WOHL     66 PRL 17 107         C G WOHL, F T SOLMITZ, R L STEVENSON //LRL IJP
KYCIA    67 PRIVATE COMM.      T F KYCIA                          //BNL  I
TRIPP    67 NP B3 10           + LEITH, +    //LRL,SLAC,CERN,HEIDEL,SACLAY
GALTIERI 67 PRIVATE COMM       L BARDARO-GALTIERI                 //LRL

                PAPERS NOT REFERRED TO IN DATA CARDS.

COOL     66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
      -- REPLACED BY KYCIA 67.

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```

Σ(2250)

48 Y*1(2250, JP=) I=1

48 Y*1(2250) MASS (MEV)

```
M   *     2245.0                     BLANPIED  65 CNTR    GAMMA P TO K+ Y*
M   *     2299.0      6.0            BOCK      65 HBC     PBAR P 5.7 BEV/C
M         2252.0     10.0            KYCIA     67 CNTR    K-P, D TCTAL      8/67
```

48 Y*1(2250) WIDTH (MEV)

```
W   *      150.0                     BLANPIED  65 CNTR
W   *       21.0     17.0     21.0  BOCK      65 HBC
W          200.0     20.0           KYCIA     67 CNTR                     8/67
```

48 Y*1(2250) PARTIAL DECAY MODES

```
P1        Y*1(2250) INTO KBAR N                          S11S17
P2        Y*1(2250) INTO KBAR N PI                       S11S17S 8
```

48 Y*1(2250) BRANCHING RATIOS

```
R1        Y*1(2250) INTO (KBAR N)/TOTAL                  (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1           0.31       0.02        KYCIA     67 CNTR                     8/67

****** ********* ********* ********* ********* ********* ********* *********
```

REFERENCES -- Y*1(2250)

```
BLANPIED 65 PRL 14 741         +GREENBERG,HUGHES,KITCHING, +  //YALE(CEA)
BOCK     65 PL 17 166          +COOPER,FRENCH,KINSON, +       //CERN,SACLAY
KYCIA    67 PRIVATE COMM.      T F KYCIA                          //BNL  I

                PAPERS NOT REFERRED TO IN DATA CARDS.

DAUBER   66 PL 23 154          +SCHLEIN, SLATER, STORK, TICHO //UCLA(LRL)  J
      -- SUGGESTS J=9/2 RESONANT BEHAVIOR IN SIGMA- PI+, BUT APPEARS
         INCONSISTENT WITH PARAMETERS OF ABRAMS 67.
COOL     66 PRL 16 1228        +GIACOMELLI,KYCIA,LEONTIC,LI,LUNDBY,+//BNL  I
      -- REPLACED BY KYCIA 67.

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Σ(2455)

53 Y*1(2455, JP=) I=1

ONE OF TWO NEW SMALL BUMPS IN THE I=1 TOTAL CROSS SECTION (SEE THE Y*1(2595)). IT IS REASONABLE TO INTERPRET THEM AS RESONANCES, THOUGH THAT IS NOT CERTAIN. THERE IS ALSO LESSER EVIDENCE FOR NEW STRUCTURE IN THE I=0 CROSS SECTION -- SEE ABRAMS 67.

53 Y*1(2455) MASS (MEV)

```
M         2455.0     10.0            ABRAMS    67 CNTR    K-P, D TCTAL      11/67
```

53 Y*1(2455) WIDTH (MEV)

```
W          140.0     APPROXIMATELY   ABRAMS    67 CNTR                     11/67
```

53 Y*1(2455) PARTIAL DECAY MODES

```
P1        Y*1(2455) INTO KBAR N                          S11S17
```

53 Y*1(2455) BRANCHING RATIOS

```
R1        Y*1(2455) INTO (KBAR N)/TOTAL                  (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1           0.26                   ABRAMS    67 CNTR                     11/67

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```

REFERENCES -- Y*1(2455)

```
ABRAMS   67 PRL 19 678         +COOL,GIACOMELLI,KYCIA,LEONTIC,LI, + //BNL

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```

Σ(2595)

54 Y*1(2595, JP=) I=1

SEE NOTE UNDER THE Y*1(2455).

54 Y*1(2595) MASS (MEV)

```
M         2595.0     10.0            ABRAMS    67 CNTR    K-P, D TCTAL      11/67
```

54 Y*1(2595) WIDTH (MEV)

```
W          140.0     APPROXIMATELY   ABRAMS    67 CNTR                     11/67
```

54 Y*1(2595) PARTIAL DECAY MODES

```
P1        Y*1(2595) INTO KBAR N                          S11S17
```

54 Y*1(2595) BRANCHING RATIOS

```
R1        Y*1(2595) INTO (KBAR N)/TOTAL                  (P1)/TOTAL
     J IS NOT KNOWN.  FOLLOWING IS (J+1/2)*(KBAR N)/TOTAL
R1           0.26                   ABRAMS    67 CNTR                     11/67

****** ********* ********* ********* ********* ********* ********* *********
```

REFERENCES -- Y*1(2595)

```
ABRAMS   67 PRL 19 678         +COOL,GIACOMELLI,KYCIA,LEONTIC,LI, + //BNL

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Σ(3000)

59 Y*1(3000, JP=) I=1

ENHANCEMENT IN LAMBDA PI AND KBAR N INVARIANT MASS SPECTRA AND IN MISSING MASS OF NEUTRALS RECOILING AGAINST K0. EVIDENCE NOT CONCLUSIVE. OMITTED FROM TABLE.

59 Y*1(3000) MASS (MEV)

```
M         3000.0                   EHRLICH   66 HBC  C  PI-P 7.91 BEV/C
```

59 Y*1(3000) PARTIAL DECAY MODES

```
P1        Y*1(3000) INTO KBAR N                          S11S17
P2        Y*1(3000) INTO LAMBDA PI                       S18S 8

****** ********* ********* ********* ********* ********* ********* *********
```

REFERENCES -- Y*1(3000)

```
EHRLICH  66 PR 152 1194        R EHRLICH, W SELOVE, F YUTA    //PENN(BNL)  I

****** ********* ********* ********* ********* ********* ********* *********
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```

Ξ

22 XI - (1321,JP=1/2) I=1/2

SEE LISTINGS OF STABLE PARTICLES

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****** ********* ********* ********* ********* ********* ********* *********
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ANY CHARACTER IN THESE COLUMNS MEANS THAT THE DATA HAS NOT BEEN AVERAGED.

Ξ°

23 XI 0 (1314, JP=1/2) I=1/2

SEE LISTINGS OF STABLE PARTICLES

Ξ (1530)

49 XI*1/2(1530, JP=3/2+) I=1/2

49 XI*1/2(1530) MASS (MEV)

M	*	1529.0	5.0	PJERROU	62 HBC	0- K-P 1.8 BEV/C	
M	*	1532.0	2.0	BADIER	64 HBC	C- K-P 3 BEV/C	
M-		1535.7	3.2	LONDON	66 HBC	- K-P 2.24 BEV/C	
MO		1528.7	1.1	LONDON	66 HBC	C	

49 XI*(-)-XI*(0) MASS DIFFERENCE (MEV)

D		5.7	3.0	PJERROU	65 HBC	C- K-P 1.8-1.95 B/C	
D	R	7.0	4.0	LONDON	66 HBC	C	
D	R	REDUNDANT WITH DATA IN MASS LISTING.					
D		2.0	3.2	MERRILL	66 HBC	C- K-P 1.7-2.7 BE/C	
D		. . . . .					
D	AVG	3.9692	2.1866	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

49 XI*1/2(1530) WIDTH (MEV)

W		7.0	2.0	SCHLEIN	63 HBC	C K-P 1.8-1.95 B/C	
W		8.5	3.5	LONDON	66 HBC	C	
W		7.0	7.0	BERGE	66 HBC	C K-P 1.5-1.7 BE/C	
W		. . . . .					
W	AVG	7.3476	1.6854	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

49 XI*1/2(1530) PARTIAL DECAY MODES

P1	XI*1/2(1530) INTO XI PI	S22S 8

REFERENCES -- XI*1/2(1530)

PJERROU	62 PRL 9 114	+PROWSE,SCHLEIN,SLATER,STORK,TICHO //UCLA	I
SCHLEIN	63 PRL 11 167	+CARMONY,PJERROU,SLATER,STORK,TICHO //UCLA	IJP
BADIER	64 DUBNA I 593	+DEMOULIN,GOLDBERG, + //EP,SACLAY,AMSTR	I
PJERROU	65 PRL 14 275	+SCHLEIN,SLATER,SMITH,STORK,TICHO //UCLA	
LONDON	66 PR 143 1034	+RAO,SAMIOS,YAMAMOTO,GOLDBERG,+ //BNL,SYCR	IJ
BERGE	66 PR 147 945	+EBERHARD,HUBBARD,MERRILL,B-SHAFER,+ //LRL	I
MERRILL	66 UCRL-16455 THESIS	D W MERRILL //LRL	JP

QUANTUM NUMBER DETERMINATION NOT REFERRED TO IN DATA CARDS.

SHAFER	66 PR 142 883	BUTTON-SHAFER,LINDSEY,MURRAY,SMITH //LRL	JP

Ξ (1705)

51 XI*1/2(1705, JP=) I=1/2

EVIDENCE NOT COMPELLING. OMITTED FROM TABLE.

51 XI*1/2(1705) MASS (MEV)

M		1705.0	APPROX	SMITH	65 HBC	0- K-P 2.1-.7 BEV/C	

51 XI*1/2(1705) WIDTH (MEV)

W		20.0	APPROX	SMITH	65 HBC	C-	

51 XI*1/2(1705) PARTIAL DECAY MODES

P1	XI*1/2(1705) INTO XI PI	S22S 8
P2	XI*1/2(1705) INTO LAMBDA KBAR	S10S11

REFERENCES -- XI*1/2(1705)

SMITH	65 ATHENS CONF 251	G A SMITH, J S LINDSEY	//LRL I

Ξ (1815)

50 XI*1/2(1815, JP=) I=1/2

50 XI*1/2(1815) MASS (MEV)

M	*	1770.0		HALSTEINS	63 FBC	C- K-FR 3.5 BEV/C	
M		1817.0	7.0	SMITH 1	65 HBC	C- K-P 2.4-.7 BEV/C	
M		1814.0	4.0	BADIER	65 HBC	C K-P 3 BEV/C	
M		. . . . .					
M	AVG	1814.7365	3.4730	AVERAGE (ERROR INCLUDES SCALE FACTOR = 1.0)			

50 XI*1/2(1815) WIDTH (MEV)

W	*	80.0	OR LESS	HALSTEINS	63 FBC	C-	
W		12.0	4.0	BADIER	65 HBC	C	
W		30.0	7.0	SMITH 2	65 HBC	C-	
W		. . . . .					
W	AVG	16.4308	7.7538	AVERAGE (ERROR INCLUDES SCALE FACTOR = 2.2)			

50 XI*1/2(1815) PARTIAL DECAY MODES

P1	XI*1/2(1815) INTO LAMBDA KBAR	S10S11
P2	XI*1/2(1815) INTO XI PI	S22S 8
P3	XI*1/2(1815) INTO SIGMA KBAR	S20S11
P4	XI*1/2(1815) INTO XI*1/2(1530) PI	D49S 8
P5	XI*(1815) INTO XI PI PI (XI PI NOT XI*(1530))	S22S 8S 8

50 XI*1/2(1815) BRANCHING RATIOS

R1		XI*1/2(1815) INTO (LAMBDA KBAR)/TOTAL				(P1)/TOTAL
R1	*	LARGE		BADIER	65 HBC	
R1	*	LARGE		SMITH 2	65 HBC	
R2		XI*1/2(1815) INTO (XI PI)/(LAMBDA KBAR)				(P2)/(P1)
R2		0.20	0.20	BADIER	65 HBC	
R2	*	SMALL		SMITH 2	65 HBC	IF XI*1933 EXIST
R3		XI*1/2(1815) INTO (SIGMA KBAR)/TOTAL				(P3)/TOTAL
R3		0.02	OR LESS	TRIPP	67 RVUE	8/67
R4		XI*1/2(1815) INTO (XI*(1530) PI)/(LAM KBAR)				(P4)/(P1)
R4		0.26	0.13	SMITH 1	65 HBC	
R4	*	SMALL		BADIER	65 HBC	
R5		XI*1/2(1815) INTO (XI PI PI)/(LAMBDA KBAR)				(P5)/(P1)
R5		0.1	OR MORE	SMITH 1	65 HBC	
R5	*	SMALL		BADIER	65 HBC	

REFERENCES -- XI*1/2(1815)

HALSTEIN	63 SIENA CONF 173	HALSTEINSLIC,+//BERGEN,CERN,EP,RTHF,UNICOL	I
SMITH 1	65 PRL 14 25	+LINDSEY,BUTTON-SHAFER,MURRAY //LRL	IJP
BADIER	65 PL 16 171	+DEMOULIN,GOLDBERG, + //EP,SACLAY,AMSTR	I
SMITH 2	65 ATHENS CONF 251	G A SMITH, J S LINDSEY //LRL	
TRIPP	67 NP B3 10	+ LEITH, + //LRL,SLAC,CERN,HEIDEL,SACLAY	

-- USES DATA OF SMITH 1.

Ξ (1935)

52 XI*1/2(1935, JP=) I=1/2

SEEN AS AN ENHANCEMENT IN THE XI PI INVARIANT MASS SPECTRUM. LITTLE IS KNOWN ABOUT IT, AND EVEN ITS EXISTENCE IS NOT CERTAIN.

52 XI*1/2(1935) MASS (MEV)

M		1933.0	16.0	BADIER	65 HBC	0 K-P 3 BEV/C	

52 XI*1/2(1935) WIDTH (MEV)

W		140.0	35.0	BADIER	65 HBC	0	

52 XI*1/2(1935) PARTIAL DECAY MODES

P1	XI*1/2(1935) INTO XI PI	S22S 8

REFERENCES -- XI*1/2(1935)

BADIER	65 PL 16 171	+DEMOULIN,GOLDBERG, + //EP,SACLAY,AMST	I

Ω⁻

24 OMEGA - (1675, JP=3/2+) I=0

SEE LISTINGS OF STABLE PARTICLES

Appendix I. Partial Rates in K^+ and K^0 Decay

The quantities of interest for making tests of theoretical predictions regarding K decay are usually partial decay rates for single channels or special sums of channels. It is not possible to compute the errors on sums, difference, and ratios of partial decay rates from the information given in Table S because of the presence of off-diagonal terms in the error matrix. For this reason we give some of these quantities below.

Table I.

$\Gamma_{K^+_{\ell 3}} = \Gamma_{K^+_{e3}} + \Gamma_{K^+_{\mu 3}}$	$= (6.65 \pm .17) \times 10^6\ \text{sec}^{-1}$
$\Gamma_{K^+_{\tau}} - \Gamma_{K^+_{\tau'}}$	$= (3.13 \pm .05) \times 10^6\ \text{sec}^{-1}$
$\Gamma_{K^+_{\mu 3}} / \Gamma_{K^+_{e3}}$	$= 0.70 \pm .04$
$\Gamma_{K^+_{\tau}} / \Gamma_{K^+_{\tau'}}$	$= 3.28 \pm .09$
$\Gamma_{K^0_{\ell 3}} = \Gamma_{K^0_{e3}} + \Gamma_{K^0_{\mu 3}}$	$= (11.77 \pm 0.40) \times 10^6\ \text{sec}^{-1}$
$\Gamma_{K^0_{\mu 3}} / \Gamma_{K^0_{e3}}$	$= 0.78 \pm 0.05$
$\Gamma_{K^0_{\pi^0\pi^0\pi^0}} / \Gamma_{K^0_{\pi^+\pi^-\pi^0}}$	$= 2.10 \pm 0.21$

The $\Gamma_{K_{\ell 3}}$ rates are useful in testing the leptonic $\Delta I = \frac{1}{2}$ rule in the way suggested by Trilling.[1] The predictions are

$$\frac{\Gamma_{K^0_{\ell 3}}}{2\Gamma_{K^+_{\ell 3}}} = 1.04, \text{ a phase space factor,}$$

and

$$\frac{\Gamma_{K^0_{\mu 3}}}{\Gamma_{K^0_{e3}}} = \frac{\Gamma_{K^+_{\mu 3}}}{\Gamma_{K^+_{e3}}}.$$

From Table I,

$$\frac{\Gamma_{K^0_{\ell 3}}}{2\Gamma_{K^+_{\ell 3}}} = 0.89 \pm 0.04$$

and

$$\frac{\Gamma_{K^0_{\mu 3}}}{\Gamma_{K^0_{e3}}} \left[\frac{\Gamma_{K^+_{\mu 3}}}{\Gamma_{K^+_{e3}}}\right]^{-1} = 1.11 \pm 0.09.$$

The first result seems to show some disagreement with the prediction, but the errors should be regarded with caution, in view of the internal disagreements in the data. (Note the ideograms in the data listing for the charged K meson.)

The three pion ratios may be used in the following tests of the $\Delta I = \frac{1}{2}$ rule:

$$R_1 = \frac{2}{3} \frac{\Gamma_{K^0_{\pi^0\pi^0\pi^0}}}{\phi_1} \left[\frac{\Gamma_{K^0_{\pi^+\pi^-\pi^0}}}{\phi_2}\right]^{-1} = 1,$$

$$R_2 = \frac{1}{4} \frac{\Gamma_{K^+_{\tau}}}{\phi_3} \left[\frac{\Gamma_{K^+_{\tau'}}}{\phi_4}\right]^{-1} = 1,$$

$$R_3 = \frac{1}{2} \frac{\Gamma_{K^0_{\pi^+\pi^-\pi^0}}}{\phi_2} \left[\frac{\Gamma_{K^+_{\tau'}}}{\phi_4}\right]^{-1} = 1,$$

$$R_4 = \frac{\Gamma_{K^0_{\pi^0\pi^0\pi^0}}}{\phi_1} \left[\frac{\Gamma_{K^+_{\tau}}}{\phi_3} - \frac{\Gamma_{K^+_{\tau'}}}{\phi_4}\right]^{-1} = 1,$$

where $\phi_1 = 1.49$, $\phi_2 = 1.22$, $\phi_3 = 1.00$, $\phi_4 = 1.24$ are phase space factors given by Trilling.[1] The values in Table I lead to

$$R_1 = 1.15 \pm 0.11, \qquad R_2 = 1.02 \pm 0.03,$$

$$R_3 = 0.85 \pm 0.04, \qquad R_4 = 0.95 \pm 0.09.$$

Here there may be significant disagreements with the predictions. Consideration of the energy dependence of the matrix element does not alter this conclusion.[2]

1. G. Trilling, K-Meson Decays, UCRL-16473 (updated from Argonne Conference Proceedings, 1965, p. 115).
2. T. Devlin and S. Barshay, Phys. Rev. Letters 19, 881 (1967).