τ

$J = \frac{1}{2}$

τ discovery paper was PERL 75. $e^+ e^- \rightarrow \tau^+ \tau^-$ cross-section threshold behavior and magnitude are consistent with pointlike spin-1/2 Dirac particle. BRANDELIK 78 ruled out pointlike spin-0 or spin-1 particle. FELDMAN 78 ruled out $J = 3/2$. KIRKBY 79 also ruled out J=integer, $J = 3/2$.

τ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1776.93±0.09 OUR AVERAGE					
1777.09±0.08±0.11	175M	[1] ADACHI	23C	BELL	190 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$1776.69^{+0.17}_{-0.19}\pm0.15$		[2] ANASHIN	23A	KEDR	(6.7+ 8.5) pb^{-1}, E^{ee}_{cm}= 3.54–3.78 GeV
$1776.91\pm0.12^{+0.10}_{-0.13}$	1171	[3] ABLIKIM	14D	BES3	23.3 pb^{-1}, E^{ee}_{cm}= 3.54–3.60 GeV
1776.68±0.12±0.41	682k	[1] AUBERT	09AK	BABR	423 fb^{-1}, E^{ee}_{cm}=10.6 GeV
1776.61±0.13±0.35		[1] BELOUS	07	BELL	414 fb^{-1} E^{ee}_{cm}=10.6 GeV
1775.1 ±1.6 ±1.0	13.3k	[4] ABBIENDI	00A	OPAL	1990–1995 LEP runs
1778.2 ±0.8 ±1.2		ANASTASSOV	97	CLEO	E^{ee}_{cm}= 10.6 GeV
$1776.96^{+0.18}_{-0.21}{}^{+0.25}_{-0.17}$	65	[5] BAI	96	BES	E^{ee}_{cm}= 3.54–3.57 GeV
1776.3 ±2.4 ±1.4	11k	[6] ALBRECHT	92M	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
$1783\ ^{+3}_{-4}$	692	[7] BACINO	78B	DLCO	E^{ee}_{cm}= 3.1–7.4 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1776.81^{+0.25}_{-0.23}\pm0.15$	81	ANASHIN	07	KEDR	6.7 pb^{-1}, E^{ee}_{cm}= 3.54–3.78 GeV
1777.8 ±0.7 ±1.7	35k	[8] BALEST	93	CLEO	Repl. by ANASTASSOV 97
$1776.9\ ^{+0.4}_{-0.5}\ \pm0.2$	14	[9] BAI	92	BES	Repl. by BAI 96

[1] ADACHI 23C, AUBERT 09AK and BELOUS 07 fit τ pseudomass spectrum in $\tau \rightarrow \pi\pi^+\pi^-\nu_\tau$ decays. Result assumes $m_{\nu_\tau} = 0$.

[2] Previously also reported LEVICHEV 14. Superseedes ANASHIN 07.

[3] ABLIKIM 14D fit $\sigma(e^+ e^- \rightarrow \tau^+ \tau^-)$ at different energies near threshold.

[4] ABBIENDI 00A fit τ pseudomass spectrum in $\tau \rightarrow \pi^{\pm} \leq 2\pi^0 \nu_\tau$ and $\tau \rightarrow \pi^{\pm}\pi^+\pi^- \leq 1\pi^0\nu_\tau$ decays. Result assumes m_{ν_τ}=0.

[5] BAI 96 fit $\sigma(e^+ e^- \rightarrow \tau^+ \tau^-)$ at different energies near threshold.

[6] ALBRECHT 92M fit τ pseudomass spectrum in $\tau^- \rightarrow 2\pi^-\pi^+\nu_\tau$ decays. Result assumes m_{ν_τ}=0.

[7] BACINO 78B value comes from $e^{\pm} X^{\mp}$ threshold. Published mass 1782 MeV increased by 1 MeV using the high precision $\psi(2S)$ mass measurement of ZHOLENTZ 80 to eliminate the absolute SPEAR energy calibration uncertainty.

[8] BALEST 93 fit spectra of minimum kinematically allowed τ mass in events of the type $e^+ e^- \rightarrow \tau^+\tau^- \rightarrow (\pi^+ n\pi^0\nu_\tau)(\pi^- m\pi^0\nu_\tau)$ $n \leq 2$, $m \leq 2$, $1 \leq n+m \leq 3$. If $m_{\nu_\tau} \neq 0$, result increases by ($m^2_{\nu_\tau}$/1100 MeV).

[9] BAI 92 fit $\sigma(e^+ e^- \to \tau^+ \tau^-)$ near threshold using $e\mu$ events.

$(m_{\tau^+} - m_{\tau^-})/m_{\text{average}}$

A test of *CPT* invariance.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.8 \times 10^{-4}$	90	BELOUS	07	BELL	414 fb^{-1}, E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.5 \times 10^{-4}$	90	[1] AUBERT	09AK	BABR	423 fb^{-1}, E^{ee}_{cm}=10.6 GeV
$<3.0 \times 10^{-3}$	90	ABBIENDI	00A	OPAL	1990–1995 LEP runs

[1] AUBERT 09AK quote both the listed upper limit and $(m_{\tau^+} - m_{\tau^-})/m_{\text{average}} = (-3.4 \pm 1.3 \pm 0.3) \times 10^{-4}$.

τ MEAN LIFE

VALUE (10^{-15} s)	EVTS	DOCUMENT ID		TECN	COMMENT
290.3 ± 0.5 OUR AVERAGE					
290.17 ± 0.53 ± 0.33	1.1M	BELOUS	14	BELL	711 fb^{-1} E^{ee}_{cm}=10.6 GeV
290.9 ± 1.4 ± 1.0		ABDALLAH	04T	DLPH	1991-1995 LEP runs
293.2 ± 2.0 ± 1.5		ACCIARRI	00B	L3	1991–1995 LEP runs
290.1 ± 1.5 ± 1.1		BARATE	97R	ALEP	1989–1994 LEP runs
289.2 ± 1.7 ± 1.2		ALEXANDER	96E	OPAL	1990–1994 LEP runs
289.0 ± 2.8 ± 4.0	57.4k	BALEST	96	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
291.2 ± 2.0 ± 1.2		BARATE	97I	ALEP	Repl. by BARATE 97R
291.4 ± 3.0		ABREU	96B	DLPH	Repl. by ABDALLAH 04T
290.1 ± 4.0	34k	ACCIARRI	96K	L3	Repl. by ACCIARRI 00B
297 ± 9 ± 5	1671	ABE	95Y	SLD	1992–1993 SLC runs
304 ±14 ± 7	4100	BATTLE	92	CLEO	E^{ee}_{cm}= 10.6 GeV
301 ±29	3780	KLEINWORT	89	JADE	E^{ee}_{cm}= 35–46 GeV
288 ±16 ±17	807	AMIDEI	88	MRK2	E^{ee}_{cm}= 29 GeV
306 ±20 ±14	695	BRAUNSCH...	88C	TASS	E^{ee}_{cm}= 36 GeV
299 ±15 ±10	1311	ABACHI	87C	HRS	E^{ee}_{cm}= 29 GeV
295 ±14 ±11	5696	ALBRECHT	87P	ARG	E^{ee}_{cm}= 9.3–10.6 GeV
309 ±17 ± 7	3788	BAND	87B	MAC	E^{ee}_{cm}= 29 GeV
325 ±14 ±18	8470	BEBEK	87C	CLEO	E^{ee}_{cm}= 10.5 GeV
460 ± 190	102	FELDMAN	82	MRK2	E^{ee}_{cm}= 29 GeV

$(\tau_{\tau^+} - \tau_{\tau^-}) / \tau_{\text{average}}$

Test of *CPT* invariance.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.0 \times 10^{-3}$	90	[1] BELOUS	14	BELL	711 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] BELOUS 14 quote limit on the absolute value of the relative lifetime difference.

τ MAGNETIC MOMENT ANOMALY

The q^2 dependence is expected to be small providing no thresholds are nearby.

$\mu_\tau/(e\hbar/2m_\tau)-1 = (g_\tau-2)/2$

For a theoretical calculation $[(g_\tau-2)/2 = 117\,721(5) \times 10^{-8}]$, see EIDELMAN 07.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
−0.057 to 0.024	95	[1] AAD	23BM	ATLS	$\gamma\gamma \to \tau^+\tau^-$, Pb-Pb
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$-0.041^{+0.012}_{-0.009}$		[1,2] AAD	23BM	ATLS	$\gamma\gamma \to \tau^+\tau^-$, Pb-Pb
$0.001^{+0.055}_{-0.089}$		[2,3] TUMASYAN	23AS	CMS	$\gamma\gamma \to \tau^+\tau^-$, Pb-Pb
-0.018 ± 0.017		[2,4] ABDALLAH	04K	DLPH	$e^+e^- \to e^+e^-\tau^+\tau^-$
$<$ 0.107	95	[5] ACHARD	04G	L3	$e^+e^- \to e^+e^-\tau^+\tau^-$
−0.007 to 0.005	95	[6] GONZALEZ-S...	00	RVUE	$e^+e^- \to \tau^+\tau^-$ and $W \to \tau\nu_\tau$
−0.052 to 0.058	95	[7] ACCIARRI	98E	L3	1991–1995 LEP runs
−0.068 to 0.065	95	[8] ACKERSTAFF	98N	OPAL	1990–1995 LEP runs
−0.004 to 0.006	95	[9] ESCRIBANO	97	RVUE	$Z \to \tau^+\tau^-$ at LEP
$<$ 0.01	95	[10] ESCRIBANO	93	RVUE	$Z \to \tau^+\tau^-$ at LEP
$<$ 0.12	90	GRIFOLS	91	RVUE	$Z \to \tau\tau\gamma$ at LEP
$<$ 0.023	95	[11] SILVERMAN	83	RVUE	$e^+e^- \to \tau^+\tau^-$ at PETRA

[1] AAD 23BM measurement is derived from $\gamma\gamma \to \tau^+\tau^-$ total cross-section from 1.44 nb^{-1} LHC Pb-Pb collisions at $\sqrt{S_{NN}}$ = 5.02 TeV. Authors report both the measured value and the corresponding 95% CL limit.

[2] Measurement ill-suited for a standard average because its likelihood appears to be remarkably non-Gaussian and asymmetric according to the model-dependent extraction procedure and the reported 95% CL limits.

[3] TUMASYAN 23AS measurement is derived from $\gamma\gamma \to \tau^+\tau^-$ total cross-section from 404 μb^{-1} LHC Pb-Pb collisions at $\sqrt{S_{NN}}$ = 5.02 TeV.

[4] ABDALLAH 04K measurement is derived from $e^+e^- \to e^+e^-\tau^+\tau^-$ total cross-section measurements at $\sqrt{s}$ between 183 and 208 GeV. In addition to the measurement, the authors also quote 95% CL limits of $>$ -0.052 and $<$ 0.013.

[5] ACHARD 04G limit is derived from $e^+e^- \to e^+e^-\tau^+\tau^-$ total cross-section measurements at $\sqrt{s}$ between 189 and 206 GeV, and is on the absolute value of the magnetic moment anomaly.

[6] GONZALEZ-SPRINBERG 00 use data on tau lepton production at LEP1, SLC, and LEP2, and data from colliders and LEP2 to determine limits. Assume imaginary component is zero.

[7] ACCIARRI 98E use $Z \to \tau^+\tau^-\gamma$ events. In addition to the limits, the authors also quote a value of 0.004 ± 0.027 ± 0.023.

[8] ACKERSTAFF 98N use $Z \to \tau^+\tau^-\gamma$ events. The limit applies to an average of the form factor for off-shell τ's having p^2 ranging from m_τ^2 to $(M_Z-m_\tau)^2$.

[9] ESCRIBANO 97 use preliminary experimental results.

[10] ESCRIBANO 93 limit derived from $\Gamma(Z \to \tau^+\tau^-)$, and is on the absolute value of the magnetic moment anomaly.

[11] SILVERMAN 83 limit is derived from $e^+e^- \to \tau^+\tau^-$ total cross-section measurements for q^2 up to (37 GeV)^2.

τ ELECTRIC DIPOLE MOMENT (d_τ)

A nonzero value is forbidden by both T invariance and P invariance.

The q^2 dependence is expected to be small providing no thresholds are nearby.

Re(d_τ)

VALUE (10^{-16} e cm)	CL%	DOCUMENT ID		TECN	COMMENT
− 0.185 to 0.061	95	[1] INAMI	22	BELL	E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 2.3	90	[2] GROZIN	09A	RVUE	From e EDM limit
< 3.7	95	[3] ABDALLAH	04K	DLPH	$e^+e^- \to e^+e^-\tau^+\tau^-$ at LEP2
< 11.4	95	[4] ACHARD	04G	L3	$e^+e^- \to e^+e^-\tau^+\tau^-$ at LEP2
− 0.22 to 0.45	95	[5] INAMI	03	BELL	E^{ee}_{cm}= 10.6 GeV
< 4.6	95	[6] ALBRECHT	00	ARG	E^{ee}_{cm}= 10.4 GeV
> −3.1 and < 3.1	95	ACCIARRI	98E	L3	1991–1995 LEP runs
> −3.8 and < 3.6	95	[7] ACKERSTAFF	98N	OPAL	1990–1995 LEP runs
< 0.11	95	[8,9] ESCRIBANO	97	RVUE	$Z \to \tau^+\tau^-$ at LEP
< 0.5	95	[10] ESCRIBANO	93	RVUE	$Z \to \tau^+\tau^-$ at LEP
< 7	90	GRIFOLS	91	RVUE	$Z \to \tau\tau\gamma$ at LEP
< 1.6	90	DELAGUILA	90	RVUE	$e^+e^- \to \tau^+\tau^-$ E^{ee}_{cm}= 35 GeV

[1] INAMI 22 use $e^+e^- \to \tau^+\tau^-$ events from 833 fb^{-1} of data. Also report a measurement of Re(d_τ) = $(-0.62 \pm 0.63) \times 10^{-17}$ $e$cm.

[2] GROZIN 09A calculate the contribution to the electron electric dipole moment from the τ electric dipole moment appearing in loops, which is $\Delta d_e = 6.9 \times 10^{-12}$ d_τ. Dividing the REGAN 02 upper limit $|d_e| \le 1.6 \times 10^{-27}$ e cm at CL=90% by 6.9×10^{-12} gives this limit.

[3] ABDALLAH 04K limit is derived from $e^+e^- \to e^+e^-\tau^+\tau^-$ total cross-section measurements at $\sqrt{s}$ between 183 and 208 GeV and is on the absolute value of d_τ.

[4] ACHARD 04G limit is derived from $e^+e^- \to e^+e^-\tau^+\tau^-$ total cross-section measurements at $\sqrt{s}$ between 189 and 206 GeV, and is on the absolute value of d_τ.

[5] INAMI 03 use $e^+e^- \to \tau^+\tau^-$ events.

[6] ALBRECHT 00 use $e^+e^- \to \tau^+\tau^-$ events. Limit is on the absolute value of Re(d_τ).

[7] ACKERSTAFF 98N use $Z \to \tau^+\tau^-\gamma$ events. The limit applies to an average of the form factor for off-shell τ's having p^2 ranging from m^2_τ to $(M_Z - m_\tau)^2$.

[8] ESCRIBANO 97 derive the relationship $|d_\tau| = \cot\theta_W \, |d^W_\tau|$ using effective Lagrangian methods, and use a conference result $|d^W_\tau| < 5.8 \times 10^{-18}$ e cm at 95% CL (L. Silvestris, ICHEP96) to obtain this result.

[9] ESCRIBANO 97 use preliminary experimental results.

[10] ESCRIBANO 93 limit derived from $\Gamma(Z \to \tau^+\tau^-)$, and is on the absolute value of the electric dipole moment.

$\mathrm{Im}(d_\tau)$

VALUE (10^{-16} e cm)	CL%	DOCUMENT ID		TECN	COMMENT
−0.103 to 0.023	95	[1] INAMI	22	BELL	E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.25 to 0.008	95	[2] INAMI	03	BELL	E^{ee}_{cm} = 10.6 GeV
< 1.8	95	[3] ALBRECHT	00	ARG	E^{ee}_{cm} = 10.4 GeV

[1] INAMI 22 use $e^+ e^- \to \tau^+ \tau^-$ events from 833 fb^{-1} of data. Also report a measurement of $\mathrm{Im}(d_\tau) = (-0.40 \pm 0.32) \times 10^{-17}$ ecm.
[2] INAMI 03 use $e^+ e^- \to \tau^+ \tau^-$ events.
[3] ALBRECHT 00 use $e^+ e^- \to \tau^+ \tau^-$ events. Limit is on the absolute value of $\mathrm{Im}(d_\tau)$.

τ WEAK DIPOLE MOMENT (d^w_τ)

A nonzero value is forbidden by *CP* invariance.

The q^2 dependence is expected to be small providing no thresholds are nearby.

$\mathrm{Re}(d^w_\tau)$

VALUE (10^{-17} e cm)	CL%	DOCUMENT ID		TECN	COMMENT
<0.50	95	[1] HEISTER	03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.0	90	[1] ACCIARRI	98C	L3	1991–1995 LEP runs
<0.56	95	ACKERSTAFF	97L	OPAL	1991–1995 LEP runs
<0.78	95	[2] AKERS	95F	OPAL	Repl. by ACKERSTAFF 97L
<1.5	95	[2] BUSKULIC	95C	ALEP	Repl. by HEISTER 03F
<7.0	95	[2] ACTON	92F	OPAL	$Z \to \tau^+ \tau^-$ at LEP
<3.7	95	[2] BUSKULIC	92J	ALEP	Repl. by BUSKULIC 95C

[1] Limit is on the absolute value of the real part of the weak dipole moment.
[2] Limit is on the absolute value of the real part of the weak dipole moment, and applies for $q^2 = m^2_Z$.

$\mathrm{Im}(d^w_\tau)$

VALUE (10^{-17} e cm)	CL%	DOCUMENT ID		TECN	COMMENT
<1.1	95	[1] HEISTER	03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.5	95	ACKERSTAFF	97L	OPAL	1991–1995 LEP runs
<4.5	95	[2] AKERS	95F	OPAL	Repl. by ACKERSTAFF 97L

[1] HEISTER 03F limit is on the absolute value of the imaginary part of the weak dipole moment.
[2] Limit is on the absolute value of the imaginary part of the weak dipole moment, and applies for $q^2 = m^2_Z$.

τ WEAK ANOMALOUS MAGNETIC DIPOLE MOMENT (α^w_τ)

Electroweak radiative corrections are expected to contribute at the 10^{-6} level. See BERNABEU 95.

The q^2 dependence is expected to be small providing no thresholds are nearby.

Re(α^w_τ)

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-3}$	95	[1] HEISTER	03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
> -0.0024 and < 0.0025	95	[2] GONZALEZ-S...00		RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ and $W \rightarrow \tau\nu_\tau$
$<4.5 \times 10^{-3}$	90	[1] ACCIARRI	98C	L3	1991–1995 LEP runs

[1] Limit is on the absolute value of the real part of the weak anomalous magnetic dipole moment.

[2] GONZALEZ-SPRINBERG 00 use data on tau lepton production at LEP1, SLC, and LEP2, and data from colliders and LEP2 to determine limits. Assume imaginary component is zero.

Im(α^w_τ)

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.7 \times 10^{-3}$	95	[1] HEISTER	03F	ALEP	1990–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<9.9 \times 10^{-3}$	90	[1] ACCIARRI	98C	L3	1991–1995 LEP runs

[1] Limit is on the absolute value of the imaginary part of the weak anomalous magnetic dipole moment.

τ^- DECAY MODES

τ^+ modes are charge conjugates of the modes below. "$h^\pm$" stands for $\pi^\pm$ or $K^\pm$. "ℓ" stands for e or μ. "Neutrals" stands for γ's and/or π^0's.

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Modes with one charged particle			
Γ_1	particle$^-$ ≥ 0 neutrals $\geq 0 K^0 \nu_\tau$ ("1-prong")		(85.24 ± 0.06) %	
Γ_2	particle$^-$ ≥ 0 neutrals $\geq 0 K^0_L \nu_\tau$		(84.58 ± 0.06) %	
Γ_3	$\mu^- \overline{\nu}_\mu \nu_\tau$	[a]	(17.39 ± 0.04) %	
Γ_4	$\mu^- \overline{\nu}_\mu \nu_\tau \gamma$	[b]	$(3.67 \pm 0.08) \times 10^{-3}$	
Γ_5	$e^- \overline{\nu}_e \nu_\tau$	[a]	(17.82 ± 0.04) %	
Γ_6	$e^- \overline{\nu}_e \nu_\tau \gamma$	[b]	(1.83 ± 0.05) %	
Γ_7	$h^- \geq 0 K^0_L \nu_\tau$		(12.03 ± 0.05) %	
Γ_8	$h^- \nu_\tau$		(11.51 ± 0.05) %	
Γ_9	$\pi^- \nu_\tau$	[a]	(10.82 ± 0.05) %	
Γ_{10}	$K^- \nu_\tau$	[a]	$(6.96 \pm 0.10) \times 10^{-3}$	

Γ_{11}	$h^- \geq 1$ neutrals ν_τ		(37.00 ± 0.09) %		
Γ_{12}	$h^- \geq 1\pi^0 \nu_\tau$ (ex.K^0)		(36.50 ± 0.09) %		
Γ_{13}	$h^- \pi^0 \nu_\tau$		(25.93 ± 0.09) %		
Γ_{14}	$\pi^- \pi^0 \nu_\tau$	[a]	(25.49 ± 0.09) %		
Γ_{15}	$\pi^- \pi^0$ non-$\rho(770) \nu_\tau$		(3.0 ± 3.2)	$\times 10^{-3}$	
Γ_{16}	$K^- \pi^0 \nu_\tau$	[a]	(4.33 ± 0.15)	$\times 10^{-3}$	
Γ_{17}	$h^- \geq 2\pi^0 \nu_\tau$		(10.81 ± 0.09) %		
Γ_{18}	$h^- 2\pi^0 \nu_\tau$		(9.48 ± 0.10) %		
Γ_{19}	$h^- 2\pi^0 \nu_\tau$ (ex.K^0)		(9.32 ± 0.10) %		
Γ_{20}	$\pi^- 2\pi^0 \nu_\tau$ (ex.K^0)	[a]	(9.26 ± 0.10) %		
Γ_{21}	$\pi^- 2\pi^0 \nu_\tau$ (ex.K^0), scalar		< 9	$\times 10^{-3}$	CL=95%
Γ_{22}	$\pi^- 2\pi^0 \nu_\tau$ (ex.K^0), vector		< 7	$\times 10^{-3}$	CL=95%
Γ_{23}	$K^- 2\pi^0 \nu_\tau$ (ex.K^0)	[a]	(6.5 ± 2.2)	$\times 10^{-4}$	
Γ_{24}	$h^- \geq 3\pi^0 \nu_\tau$		(1.34 ± 0.07) %		
Γ_{25}	$h^- \geq 3\pi^0 \nu_\tau$ (ex. K^0)		(1.25 ± 0.07) %		
Γ_{26}	$h^- 3\pi^0 \nu_\tau$		(1.18 ± 0.07) %		
Γ_{27}	$\pi^- 3\pi^0 \nu_\tau$ (ex.K^0)	[a]	(1.04 ± 0.07) %		
Γ_{28}	$K^- 3\pi^0 \nu_\tau$ (ex.K^0, η)	[a]	(4.8 ± 2.1)	$\times 10^{-4}$	
Γ_{29}	$h^- 4\pi^0 \nu_\tau$ (ex.K^0)		(1.6 ± 0.4)	$\times 10^{-3}$	
Γ_{30}	$h^- 4\pi^0 \nu_\tau$ (ex.K^0,η)	[a]	(1.1 ± 0.4)	$\times 10^{-3}$	
Γ_{31}	$a_1(1260) \nu_\tau \rightarrow \pi^- \gamma \nu_\tau$		(4.0 ± 1.5)	$\times 10^{-4}$	
Γ_{32}	$K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma\ \nu_\tau$		(1.552± 0.029) %		
Γ_{33}	$K^- \geq 1$ (π^0 or K^0 or γ) ν_τ		(8.59 ± 0.28)	$\times 10^{-3}$	

Modes with K^0's

Γ_{34}	K^0_S (particles)$^- \nu_\tau$		(9.43 ± 0.28)	$\times 10^{-3}$	
Γ_{35}	$h^- \overline{K}^0 \nu_\tau$		(9.87 ± 0.14)	$\times 10^{-3}$	
Γ_{36}	$\pi^- \overline{K}^0 \nu_\tau$	[a]	(8.38 ± 0.14)	$\times 10^{-3}$	
Γ_{37}	$\pi^- \overline{K}^0$ (non-$K^*(892)^-$) ν_τ		(5.4 ± 2.1)	$\times 10^{-4}$	
Γ_{38}	$K^- K^0 \nu_\tau$	[a]	(1.486± 0.034)	$\times 10^{-3}$	
Γ_{39}	$K^- K^0 \geq 0\pi^0 \nu_\tau$		(2.99 ± 0.07)	$\times 10^{-3}$	
Γ_{40}	$h^- \overline{K}^0 \pi^0 \nu_\tau$		(5.32 ± 0.13)	$\times 10^{-3}$	
Γ_{41}	$\pi^- \overline{K}^0 \pi^0 \nu_\tau$	[a]	(3.82 ± 0.13)	$\times 10^{-3}$	
Γ_{42}	$\overline{K}^0 \rho^- \nu_\tau$		(2.2 ± 0.5)	$\times 10^{-3}$	
Γ_{43}	$K^- K^0 \pi^0 \nu_\tau$	[a]	(1.50 ± 0.07)	$\times 10^{-3}$	
Γ_{44}	$\pi^- \overline{K}^0 \geq 1\pi^0 \nu_\tau$		(4.08 ± 0.25)	$\times 10^{-3}$	
Γ_{45}	$\pi^- \overline{K}^0 \pi^0 \pi^0 \nu_\tau$ (ex.K^0)	[a]	(2.6 ± 2.3)	$\times 10^{-4}$	
Γ_{46}	$K^- K^0 \pi^0 \pi^0 \nu_\tau$		< 1.6	$\times 10^{-4}$	CL=95%
Γ_{47}	$\pi^- K^0 \overline{K}^0 \nu_\tau$		(1.55 ± 0.24)	$\times 10^{-3}$	
Γ_{48}	$\pi^- K^0_S K^0_S \nu_\tau$	[a]	(2.35 ± 0.06)	$\times 10^{-4}$	
Γ_{49}	$\pi^- K^0_S K^0_L \nu_\tau$	[a]	(1.08 ± 0.24)	$\times 10^{-3}$	
Γ_{50}	$\pi^- K^0_L K^0_L \nu_\tau$		(2.35 ± 0.06)	$\times 10^{-4}$	

Γ_{51}	$\pi^- K^0 \overline{K}^0 \pi^0 \nu_\tau$		(3.6 ± 1.2) $\times 10^{-4}$		
Γ_{52}	$\pi^- K^0_S K^0_S \pi^0 \nu_\tau$	[a]	(1.82 ± 0.21) $\times 10^{-5}$		
Γ_{53}	$K^{*-} K^0 \pi^0 \nu_\tau \to \pi^- K^0_S K^0_S \pi^0 \nu_\tau$		(1.08 ± 0.21) $\times 10^{-5}$		
Γ_{54}	$f_1(1285) \pi^- \nu_\tau \to \pi^- K^0_S K^0_S \pi^0 \nu_\tau$		(6.8 ± 1.5) $\times 10^{-6}$		
Γ_{55}	$f_1(1420) \pi^- \nu_\tau \to \pi^- K^0_S K^0_S \pi^0 \nu_\tau$		(2.4 ± 0.8) $\times 10^{-6}$		
Γ_{56}	$\pi^- K^0_S K^0_L \pi^0 \nu_\tau$	[a]	(3.2 ± 1.2) $\times 10^{-4}$		
Γ_{57}	$\pi^- K^0_L K^0_L \pi^0 \nu_\tau$		(1.82 ± 0.21) $\times 10^{-5}$		
Γ_{58}	$K^- K^0_S K^0_S \nu_\tau$		< 6.3	$\times 10^{-7}$	CL=90%
Γ_{59}	$K^- K^0_S K^0_S \pi^0 \nu_\tau$		< 4.0	$\times 10^{-7}$	CL=90%
Γ_{60}	$K^0 h^+ h^- h^- \geq 0$ neutrals ν_τ		< 1.7	$\times 10^{-3}$	CL=95%
Γ_{61}	$K^0 h^+ h^- h^- \nu_\tau$	[a]	(2.5 ± 2.0) $\times 10^{-4}$		

Modes with three charged particles

Γ_{62}	$h^- h^- h^+ \geq 0$ neutrals $\geq 0 K^0_L \nu_\tau$		(15.20 ± 0.06) %		
Γ_{63}	$h^- h^- h^+ \geq 0$ neutrals ν_τ (ex. $K^0_S \to \pi^+ \pi^-$) ("3-prong")		(14.55 ± 0.06) %		
Γ_{64}	$h^- h^- h^+ \nu_\tau$		(9.80 ± 0.05) %		
Γ_{65}	$h^- h^- h^+ \nu_\tau$ (ex.K^0)		(9.46 ± 0.05) %		
Γ_{66}	$h^- h^- h^+ \nu_\tau$ (ex.K^0,ω)		(9.43 ± 0.05) %		
Γ_{67}	$\pi^- \pi^+ \pi^- \nu_\tau$		(9.31 ± 0.05) %		
Γ_{68}	$\pi^- \pi^+ \pi^- \nu_\tau$ (ex.K^0)		(9.02 ± 0.05) %		
Γ_{69}	$\pi^- \pi^+ \pi^- \nu_\tau$ (ex.K^0), non-axial vector		< 2.4	%	CL=95%
Γ_{70}	$\pi^- \pi^+ \pi^- \nu_\tau$ (ex.K^0,ω)	[a]	(8.99 ± 0.05) %		
Γ_{71}	$h^- h^- h^+ \geq 1$ neutrals ν_τ		(5.29 ± 0.05) %		
Γ_{72}	$h^- h^- h^+ \geq 1 \pi^0 \nu_\tau$ (ex. K^0)		(5.09 ± 0.05) %		
Γ_{73}	$h^- h^- h^+ \pi^0 \nu_\tau$		(4.76 ± 0.05) %		
Γ_{74}	$h^- h^- h^+ \pi^0 \nu_\tau$ (ex.K^0)		(4.57 ± 0.05) %		
Γ_{75}	$h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0, ω)		(2.79 ± 0.07) %		
Γ_{76}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$		(4.62 ± 0.05) %		
Γ_{77}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0)		(4.49 ± 0.05) %		
Γ_{78}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0,ω)	[a]	(2.74 ± 0.07) %		
Γ_{79}	$h^- \rho \pi^0 \nu_\tau$				
Γ_{80}	$h^- \rho^+ h^- \nu_\tau$				
Γ_{81}	$h^- \rho^- h^+ \nu_\tau$				
Γ_{82}	$h^- h^- h^+ \geq 2\pi^0 \nu_\tau$ (ex. K^0)		(5.17 ± 0.31) $\times 10^{-3}$		
Γ_{83}	$h^- h^- h^+ 2\pi^0 \nu_\tau$		(5.05 ± 0.31) $\times 10^{-3}$		
Γ_{84}	$h^- h^- h^+ 2\pi^0 \nu_\tau$ (ex.K^0)		(4.95 ± 0.31) $\times 10^{-3}$		
Γ_{85}	$h^- h^- h^+ 2\pi^0 \nu_\tau$ (ex.K^0,ω,η)	[a]	(10 ± 4) $\times 10^{-4}$		

Γ_{86}	$h^- h^- h^+ 3\pi^0 \nu_\tau$		$(2.13 \pm 0.30) \times 10^{-4}$	
Γ_{87}	$2\pi^- \pi^+ 3\pi^0 \nu_\tau$ (ex.K^0)		$(1.94 \pm 0.30) \times 10^{-4}$	
Γ_{88}	$2\pi^- \pi^+ 3\pi^0 \nu_\tau$ (ex.K^0, η, $f_1(1285)$)		$(1.7 \pm 0.4) \times 10^{-4}$	
Γ_{89}	$2\pi^- \pi^+ 3\pi^0 \nu_\tau$ (ex.K^0, η, ω, $f_1(1285)$)	[a]	$(1.4 \pm 2.7) \times 10^{-5}$	
Γ_{90}	$K^- h^+ h^- \geq 0$ neutrals ν_τ		$(6.29 \pm 0.14) \times 10^{-3}$	
Γ_{91}	$K^- h^+ \pi^- \nu_\tau$ (ex.K^0)		$(4.37 \pm 0.07) \times 10^{-3}$	
Γ_{92}	$K^- h^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0)		$(8.6 \pm 1.2) \times 10^{-4}$	
Γ_{93}	$K^- \pi^+ \pi^- \geq 0$ neutrals ν_τ		$(4.77 \pm 0.14) \times 10^{-3}$	
Γ_{94}	$K^- \pi^+ \pi^- \geq 0\pi^0 \nu_\tau$ (ex.K^0)		$(3.73 \pm 0.13) \times 10^{-3}$	
Γ_{95}	$K^- \pi^+ \pi^- \nu_\tau$		$(3.45 \pm 0.07) \times 10^{-3}$	
Γ_{96}	$K^- \pi^+ \pi^- \nu_\tau$ (ex.K^0)		$(2.93 \pm 0.07) \times 10^{-3}$	
Γ_{97}	$K^- \pi^+ \pi^- \nu_\tau$ (ex.K^0,ω)	[a]	$(2.93 \pm 0.07) \times 10^{-3}$	
Γ_{98}	$K^- \rho^0 \nu_\tau \to K^- \pi^+ \pi^- \nu_\tau$		$(1.4 \pm 0.5) \times 10^{-3}$	
Γ_{99}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$		$(1.31 \pm 0.12) \times 10^{-3}$	
Γ_{100}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0)		$(7.9 \pm 1.2) \times 10^{-4}$	
Γ_{101}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0,η)		$(7.6 \pm 1.2) \times 10^{-4}$	
Γ_{102}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0,ω)		$(3.7 \pm 0.9) \times 10^{-4}$	
Γ_{103}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex.K^0,ω,η)	[a]	$(3.9 \pm 1.4) \times 10^{-4}$	
Γ_{104}	$K^- \pi^+ K^- \geq 0$ neut. ν_τ		$< 9 \times 10^{-4}$	CL=95%
Γ_{105}	$K^- K^+ \pi^- \geq 0$ neut. ν_τ		$(1.496 \pm 0.033) \times 10^{-3}$	
Γ_{106}	$K^- K^+ \pi^- \nu_\tau$	[a]	$(1.435 \pm 0.027) \times 10^{-3}$	
Γ_{107}	$K^- K^+ \pi^- \pi^0 \nu_\tau$	[a]	$(6.1 \pm 1.8) \times 10^{-5}$	
Γ_{108}	$K^- K^+ K^- \nu_\tau$		$(2.2 \pm 0.8) \times 10^{-5}$	S=5.4
Γ_{109}	$K^- K^+ K^- \nu_\tau$ (ex. ϕ)		$< 2.5 \times 10^{-6}$	CL=90%
Γ_{110}	$K^- K^+ K^- \pi^0 \nu_\tau$		$< 4.8 \times 10^{-6}$	CL=90%
Γ_{111}	$\pi^- K^+ \pi^- \geq 0$ neut. ν_τ		$< 2.5 \times 10^{-3}$	CL=95%
Γ_{112}	$e^- e^- e^+ \overline{\nu}_e \nu_\tau$		$(2.8 \pm 1.5) \times 10^{-5}$	
Γ_{113}	$\mu^- e^- e^+ \overline{\nu}_\mu \nu_\tau$		$< 3.2 \times 10^{-5}$	CL=90%
Γ_{114}	$\pi^- e^- e^+ \nu_\tau$		seen	
Γ_{115}	$\pi^- \mu^- \mu^+ \nu_\tau$		$< 1.14 \times 10^{-5}$	CL=90%

Modes with five charged particles

Γ_{116}	$3h^- 2h^+ \geq 0$ neutrals ν_τ (ex. $K^0_S \to \pi^- \pi^+$) ("5-prong")		$(9.9 \pm 0.4) \times 10^{-4}$	
Γ_{117}	$3h^- 2h^+ \nu_\tau$ (ex.K^0)		$(8.29 \pm 0.31) \times 10^{-4}$	
Γ_{118}	$3\pi^- 2\pi^+ \nu_\tau$ (ex.K^0, ω)		$(8.27 \pm 0.31) \times 10^{-4}$	
Γ_{119}	$3\pi^- 2\pi^+ \nu_\tau$ (ex.K^0, ω, $f_1(1285)$)	[a]	$(7.75 \pm 0.30) \times 10^{-4}$	
Γ_{120}	$K^- 2\pi^- 2\pi^+ \nu_\tau$ (ex.K^0)	[a]	$(6 \pm 12) \times 10^{-7}$	
Γ_{121}	$K^+ 3\pi^- \pi^+ \nu_\tau$		$< 5.0 \times 10^{-6}$	CL=90%

Γ_{122}	$K^+ K^- 2\pi^- \pi^+ \nu_\tau$		$< 4.5 \times 10^{-7}$	CL=90%
Γ_{123}	$3h^- 2h^+ \pi^0 \nu_\tau$ (ex.K^0)		$(1.65 \pm 0.11) \times 10^{-4}$	
Γ_{124}	$3\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex.K^0)		$(1.64 \pm 0.11) \times 10^{-4}$	
Γ_{125}	$3\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex.K^0, η, $f_1(1285)$)		$(1.11 \pm 0.10) \times 10^{-4}$	
Γ_{126}	$3\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex.K^0, η, ω, $f_1(1285)$)	[a]	$(3.8 \pm 0.9) \times 10^{-5}$	
Γ_{127}	$K^- 2\pi^- 2\pi^+ \pi^0 \nu_\tau$ (ex.K^0)	[a]	$(1.1 \pm 0.6) \times 10^{-6}$	
Γ_{128}	$K^+ 3\pi^- \pi^+ \pi^0 \nu_\tau$		$< 8 \times 10^{-7}$	CL=90%
Γ_{129}	$3h^- 2h^+ 2\pi^0 \nu_\tau$		$< 3.4 \times 10^{-6}$	CL=90%

Miscellaneous other allowed modes

Γ_{130}	$(5\pi)^- \nu_\tau$		$(7.8 \pm 0.5) \times 10^{-3}$	
Γ_{131}	$4h^- 3h^+ \geq 0$ neutrals ν_τ ("7-prong")		$< 3.0 \times 10^{-7}$	CL=90%
Γ_{132}	$4h^- 3h^+ \nu_\tau$		$< 4.3 \times 10^{-7}$	CL=90%
Γ_{133}	$4h^- 3h^+ \pi^0 \nu_\tau$		$< 2.5 \times 10^{-7}$	CL=90%
Γ_{134}	$X^- (S{=}-1) \nu_\tau$		(2.92 ± 0.04) %	
Γ_{135}	$K^*(892)^- \geq 0$ neutrals $\geq 0 K^0_L \nu_\tau$		(1.42 ± 0.18) %	S=1.4
Γ_{136}	$K^*(892)^- \nu_\tau$		(1.20 ± 0.07) %	S=1.8
Γ_{137}	$K^*(892)^- \nu_\tau \to \pi^- \overline{K}^0 \nu_\tau$		$(7.82 \pm 0.26) \times 10^{-3}$	
Γ_{138}	$K^*(892)^0 K^- \geq 0$ neutrals ν_τ		$(3.2 \pm 1.4) \times 10^{-3}$	
Γ_{139}	$K^*(892)^0 K^- \nu_\tau$		$(2.1 \pm 0.4) \times 10^{-3}$	
Γ_{140}	$\overline{K}^*(892)^0 \pi^- \geq 0$ neutrals ν_τ		$(3.8 \pm 1.7) \times 10^{-3}$	
Γ_{141}	$\overline{K}^*(892)^0 \pi^- \nu_\tau$		$(2.2 \pm 0.5) \times 10^{-3}$	
Γ_{142}	$(\overline{K}^*(892)\pi)^- \nu_\tau \to \pi^- \overline{K}^0 \pi^0 \nu_\tau$		$(1.0 \pm 0.4) \times 10^{-3}$	
Γ_{143}	$K_1(1270)^- \nu_\tau$		$(4.7 \pm 1.1) \times 10^{-3}$	
Γ_{144}	$K_1(1400)^- \nu_\tau$		$(1.7 \pm 2.6) \times 10^{-3}$	S=1.7
Γ_{145}	$K^*(1410)^- \nu_\tau$		$(1.5 {}^{+1.4}_{-1.0}) \times 10^{-3}$	
Γ_{146}	$K^*_0(1430)^- \nu_\tau$		$< 5 \times 10^{-4}$	CL=95%
Γ_{147}	$K^*_2(1430)^- \nu_\tau$		$< 3 \times 10^{-3}$	CL=95%
Γ_{148}	$a_0(980)^- \geq 0$ neutrals ν_τ			
Γ_{149}	$\eta \pi^- \nu_\tau$		$< 9.9 \times 10^{-5}$	CL=95%
Γ_{150}	$\eta \pi^- \pi^0 \nu_\tau$	[a]	$(1.39 \pm 0.07) \times 10^{-3}$	
Γ_{151}	$\eta \pi^- \pi^0 \pi^0 \nu_\tau$	[a]	$(1.9 \pm 0.4) \times 10^{-4}$	
Γ_{152}	$\eta K^- \nu_\tau$	[a]	$(1.55 \pm 0.08) \times 10^{-4}$	
Γ_{153}	$\eta K^*(892)^- \nu_\tau$		$(1.38 \pm 0.15) \times 10^{-4}$	
Γ_{154}	$\eta K^- \pi^0 \nu_\tau$	[a]	$(4.8 \pm 1.2) \times 10^{-5}$	
Γ_{155}	$\eta K^- \pi^0$ (non-$K^*(892)$) ν_τ		$< 3.5 \times 10^{-5}$	CL=90%
Γ_{156}	$\eta \overline{K}^0 \pi^- \nu_\tau$	[a]	$(9.4 \pm 1.5) \times 10^{-5}$	
Γ_{157}	$\eta \overline{K}^0 \pi^- \pi^0 \nu_\tau$		$< 5.0 \times 10^{-5}$	CL=90%
Γ_{158}	$\eta K^- K^0 \nu_\tau$		$< 9.0 \times 10^{-6}$	CL=90%

Γ_{159}	$\eta\pi^+\pi^-\pi^- \geq 0$ neutrals ν_τ		< 3	$\times 10^{-3}$	CL=90%
Γ_{160}	$\eta\pi^-\pi^+\pi^-\nu_\tau$ (ex.K^0)	[a]	(2.20 ± 0.13)	$\times 10^{-4}$	
Γ_{161}	$\eta\pi^-\pi^+\pi^-\nu_\tau$ (ex.K^0,$f_1(1285)$)		(9.9 ± 1.6)	$\times 10^{-5}$	
Γ_{162}	$\eta a_1(1260)^-\nu_\tau \to \eta\pi^-\rho^0\nu_\tau$		< 3.9	$\times 10^{-4}$	CL=90%
Γ_{163}	$\eta\eta\pi^-\nu_\tau$		< 7.4	$\times 10^{-6}$	CL=90%
Γ_{164}	$\eta\eta\pi^-\pi^0\nu_\tau$		< 2.0	$\times 10^{-4}$	CL=95%
Γ_{165}	$\eta\eta K^-\nu_\tau$		< 3.0	$\times 10^{-6}$	CL=90%
Γ_{166}	$\eta'(958)\pi^-\nu_\tau$		< 4.0	$\times 10^{-6}$	CL=90%
Γ_{167}	$\eta'(958)\pi^-\pi^0\nu_\tau$		< 1.2	$\times 10^{-5}$	CL=90%
Γ_{168}	$\eta'(958)K^-\nu_\tau$		< 2.4	$\times 10^{-6}$	CL=90%
Γ_{169}	$\phi\pi^-\nu_\tau$		(3.4 ± 0.6)	$\times 10^{-5}$	
Γ_{170}	$\phi K^-\nu_\tau$	[a]	(4.4 ± 1.6)	$\times 10^{-5}$	
Γ_{171}	$f_1(1285)\pi^-\nu_\tau$		(3.9 ± 0.5)	$\times 10^{-4}$	S=1.9
Γ_{172}	$f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau$		(1.18 ± 0.07)	$\times 10^{-4}$	S=1.3
Γ_{173}	$f_1(1285)\pi^-\nu_\tau \to 3\pi^-2\pi^+\nu_\tau$	[a]	(5.2 ± 0.4)	$\times 10^{-5}$	
Γ_{174}	$\pi(1300)^-\nu_\tau \to (\rho\pi)^-\nu_\tau \to (3\pi)^-\nu_\tau$		< 1.0	$\times 10^{-4}$	CL=90%
Γ_{175}	$\pi(1300)^-\nu_\tau \to ((\pi\pi)_{S-\text{wave}}\pi)^-\nu_\tau \to (3\pi)^-\nu_\tau$		< 1.9	$\times 10^{-4}$	CL=90%
Γ_{176}	$h^-\omega \geq 0$ neutrals ν_τ		(2.40 ± 0.08) %		
Γ_{177}	$h^-\omega\nu_\tau$		(1.99 ± 0.06) %		
Γ_{178}	$\pi^-\omega\nu_\tau$	[a]	(1.95 ± 0.06) %		
Γ_{179}	$K^-\omega\nu_\tau$	[a]	(4.1 ± 0.9)	$\times 10^{-4}$	
Γ_{180}	$h^-\omega\pi^0\nu_\tau$	[a]	(4.1 ± 0.4)	$\times 10^{-3}$	
Γ_{181}	$h^-\omega 2\pi^0\nu_\tau$		(1.4 ± 0.5)	$\times 10^{-4}$	
Γ_{182}	$\pi^-\omega 2\pi^0\nu_\tau$	[a]	(7.2 ± 1.6)	$\times 10^{-5}$	
Γ_{183}	$h^- 2\omega\nu_\tau$		< 5.4	$\times 10^{-7}$	CL=90%
Γ_{184}	$2h^- h^+\omega\nu_\tau$		(1.20 ± 0.22)	$\times 10^{-4}$	
Γ_{185}	$2\pi^-\pi^+\omega\nu_\tau$ (ex.K^0)	[a]	(8.4 ± 0.6)	$\times 10^{-5}$	

Lepton Family number (*LF*), Lepton number (*L*), or Baryon number (*B*) violating modes

L means lepton number violation (*e.g.* $\tau^- \to e^+\pi^-\pi^-$). Following common usage, *LF* means lepton family violation *and not* lepton number violation (*e.g.* $\tau^- \to e^-\pi^+\pi^-$). *B* means baryon number violation.

Γ_{186}	$e^-\gamma$	*LF*	< 3.3	$\times 10^{-8}$	CL=90%
Γ_{187}	$e^-\gamma\gamma$	*LF*	< 2.5	$\times 10^{-4}$	CL=90%
Γ_{188}	$\mu^-\gamma$	*LF*	< 4.2	$\times 10^{-8}$	CL=90%
Γ_{189}	$\mu^-\gamma\gamma$	*LF*	< 5.8	$\times 10^{-4}$	CL=90%
Γ_{190}	$e^-\pi^0$	*LF*	< 8.0	$\times 10^{-8}$	CL=90%
Γ_{191}	$\mu^-\pi^0$	*LF*	< 1.1	$\times 10^{-7}$	CL=90%
Γ_{192}	$e^-K^0_S$	*LF*	< 2.6	$\times 10^{-8}$	CL=90%

Γ_{193}	$\mu^- K^0_S$	LF	<	2.3	$\times 10^{-8}$	CL=90%
Γ_{194}	$e^- \eta$	LF	<	9.2	$\times 10^{-8}$	CL=90%
Γ_{195}	$\mu^- \eta$	LF	<	6.5	$\times 10^{-8}$	CL=90%
Γ_{196}	$e^- \rho^0$	LF	<	2.2	$\times 10^{-8}$	CL=90%
Γ_{197}	$\mu^- \rho^0$	LF	<	1.7	$\times 10^{-8}$	CL=90%
Γ_{198}	$e^- \omega$	LF	<	2.4	$\times 10^{-8}$	CL=90%
Γ_{199}	$\mu^- \omega$	LF	<	3.9	$\times 10^{-8}$	CL=90%
Γ_{200}	$e^- K^*(892)^0$	LF	<	1.9	$\times 10^{-8}$	CL=90%
Γ_{201}	$\mu^- K^*(892)^0$	LF	<	2.9	$\times 10^{-8}$	CL=90%
Γ_{202}	$e^- \overline{K}^*(892)^0$	LF	<	1.7	$\times 10^{-8}$	CL=90%
Γ_{203}	$\mu^- \overline{K}^*(892)^0$	LF	<	4.3	$\times 10^{-8}$	CL=90%
Γ_{204}	$e^- \eta'(958)$	LF	<	1.6	$\times 10^{-7}$	CL=90%
Γ_{205}	$\mu^- \eta'(958)$	LF	<	1.3	$\times 10^{-7}$	CL=90%
Γ_{206}	$e^- f_0(980) \to e^- \pi^+ \pi^-$	LF	<	3.2	$\times 10^{-8}$	CL=90%
Γ_{207}	$\mu^- f_0(980) \to \mu^- \pi^+ \pi^-$	LF	<	3.4	$\times 10^{-8}$	CL=90%
Γ_{208}	$e^- \phi$	LF	<	2.0	$\times 10^{-8}$	CL=90%
Γ_{209}	$\mu^- \phi$	LF	<	2.3	$\times 10^{-8}$	CL=90%
Γ_{210}	$e^- e^+ e^-$	LF	<	2.7	$\times 10^{-8}$	CL=90%
Γ_{211}	$e^- \mu^+ \mu^-$	LF	<	2.7	$\times 10^{-8}$	CL=90%
Γ_{212}	$e^+ \mu^- \mu^-$	LF	<	1.7	$\times 10^{-8}$	CL=90%
Γ_{213}	$\mu^- e^+ e^-$	LF	<	1.8	$\times 10^{-8}$	CL=90%
Γ_{214}	$\mu^+ e^- e^-$	LF	<	1.5	$\times 10^{-8}$	CL=90%
Γ_{215}	$\mu^- \mu^+ \mu^-$	LF	<	2.1	$\times 10^{-8}$	CL=90%
Γ_{216}	$e^- \pi^+ \pi^-$	LF	<	2.3	$\times 10^{-8}$	CL=90%
Γ_{217}	$e^+ \pi^- \pi^-$	L	<	2.0	$\times 10^{-8}$	CL=90%
Γ_{218}	$\mu^- \pi^+ \pi^-$	LF	<	2.1	$\times 10^{-8}$	CL=90%
Γ_{219}	$\mu^+ \pi^- \pi^-$	L	<	3.9	$\times 10^{-8}$	CL=90%
Γ_{220}	$e^- \pi^+ K^-$	LF	<	3.7	$\times 10^{-8}$	CL=90%
Γ_{221}	$e^- \pi^- K^+$	LF	<	3.1	$\times 10^{-8}$	CL=90%
Γ_{222}	$e^+ \pi^- K^-$	L	<	3.2	$\times 10^{-8}$	CL=90%
Γ_{223}	$e^- K^0_S K^0_S$	LF	<	7.1	$\times 10^{-8}$	CL=90%
Γ_{224}	$e^- K^+ K^-$	LF	<	3.4	$\times 10^{-8}$	CL=90%
Γ_{225}	$e^+ K^- K^-$	L	<	3.3	$\times 10^{-8}$	CL=90%
Γ_{226}	$\mu^- \pi^+ K^-$	LF	<	8.6	$\times 10^{-8}$	CL=90%
Γ_{227}	$\mu^- \pi^- K^+$	LF	<	4.5	$\times 10^{-8}$	CL=90%
Γ_{228}	$\mu^+ \pi^- K^-$	L	<	4.8	$\times 10^{-8}$	CL=90%
Γ_{229}	$\mu^- K^0_S K^0_S$	LF	<	8.0	$\times 10^{-8}$	CL=90%
Γ_{230}	$\mu^- K^+ K^-$	LF	<	4.4	$\times 10^{-8}$	CL=90%
Γ_{231}	$\mu^+ K^- K^-$	L	<	4.7	$\times 10^{-8}$	CL=90%
Γ_{232}	$e^- \pi^0 \pi^0$	LF	<	6.5	$\times 10^{-6}$	CL=90%
Γ_{233}	$\mu^- \pi^0 \pi^0$	LF	<	1.4	$\times 10^{-5}$	CL=90%
Γ_{234}	$e^- \eta \eta$	LF	<	3.5	$\times 10^{-5}$	CL=90%
Γ_{235}	$\mu^- \eta \eta$	LF	<	6.0	$\times 10^{-5}$	CL=90%
Γ_{236}	$e^- \pi^0 \eta$	LF	<	2.4	$\times 10^{-5}$	CL=90%

Γ_{237}	$\mu^- \pi^0 \eta$	*LF*	<	2.2	$\times 10^{-5}$	CL=90%
Γ_{238}	$p e^- e^-$	*L,B*	<	3.0	$\times 10^{-8}$	CL=90%
Γ_{239}	$\overline{p} e^+ e^-$	*L,B*	<	3.0	$\times 10^{-8}$	CL=90%
Γ_{240}	$\overline{p} e^+ \mu^-$	*L,B*	<	2.0	$\times 10^{-8}$	CL=90%
Γ_{241}	$\overline{p} e^- \mu^+$	*L,B*	<	1.8	$\times 10^{-8}$	CL=90%
Γ_{242}	$p \mu^- \mu^-$	*L,B*	<	4.0	$\times 10^{-8}$	CL=90%
Γ_{243}	$\overline{p} \mu^+ \mu^-$	*L,B*	<	1.8	$\times 10^{-8}$	CL=90%
Γ_{244}	$\overline{p} \gamma$	*L,B*	<	3.5	$\times 10^{-6}$	CL=90%
Γ_{245}	$\overline{p} \pi^0$	*L,B*	<	1.5	$\times 10^{-5}$	CL=90%
Γ_{246}	$\overline{p} 2\pi^0$	*L,B*	<	3.3	$\times 10^{-5}$	CL=90%
Γ_{247}	$\overline{p} \eta$	*L,B*	<	8.9	$\times 10^{-6}$	CL=90%
Γ_{248}	$\overline{p} \pi^0 \eta$	*L,B*	<	2.7	$\times 10^{-5}$	CL=90%
Γ_{249}	$\Lambda \pi^-$	*L,B*	<	7.2	$\times 10^{-8}$	CL=90%
Γ_{250}	$\overline{\Lambda} \pi^-$	*L,B*	<	1.4	$\times 10^{-7}$	CL=90%
Γ_{251}	e^- light boson	*LF*	<	9	$\times 10^{-4}$	CL=95%
Γ_{252}	μ^- light boson	*LF*	<	6	$\times 10^{-4}$	CL=95%

[*a*] Basis mode for the τ.

[*b*] See the Particle Listings below for the energy limits used in this measurement.

CONSTRAINED FIT INFORMATION

An overall fit to 85 branching ratios uses 170 measurements and one constraint to determine 46 parameters. The overall fit has a $\chi^2 = 135.0$ for 125 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle \delta x_i \delta x_j \right\rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_{5}	18									
x_{9}	2	−1								
x_{10}	3	4	5							
x_{14}	−18	−19	−17	−5						
x_{16}	−1	−1	0	−2	−9					
x_{20}	−11	−11	−14	−4	−46	−1				
x_{23}	−1	0	−2	−3	−1	−14	−10			
x_{27}	−6	−5	−10	−1	0	1	−39	1		
x_{28}	0	−1	−1	−2	0	−13	−3	−23	−11	
x_{30}	−4	−3	−11	−1	−9	0	7	−2	−44	2
x_{36}	−2	−2	−3	−1	−1	−1	−2	0	−1	0
x_{38}	−1	−1	1	0	0	0	0	−2	0	−2
x_{41}	−2	−2	−2	−1	−1	0	−2	0	−1	0
x_{43}	−1	−1	−1	−1	0	−3	0	−5	0	−5
x_{45}	−5	−5	−5	−2	−3	−1	−4	−2	−1	−2
x_{48}	−1	−1	2	0	−1	2	−1	−1	0	−1
x_{49}	−5	−5	−5	−2	−3	−1	−5	−2	−1	−2
x_{52}	0	0	0	0	0	0	0	−1	0	−1
x_{56}	−2	−2	−2	−1	−1	−1	−2	−1	−1	−1
x_{61}	−5	−5	−5	−2	−3	−1	−4	−2	−1	−2
x_{70}	−7	−9	4	−2	−6	3	−12	−2	−7	−1
x_{78}	−4	−4	−5	0	−9	0	1	1	−1	1
x_{85}	0	0	−2	0	−2	0	0	0	2	0
x_{89}	0	0	0	0	0	0	0	0	0	0
x_{97}	−2	−2	−1	−1	−1	−1	−3	−1	−2	−1
x_{103}	1	1	0	−1	1	−1	−1	−1	0	−1
x_{106}	−1	−2	2	−1	−1	1	−2	−1	−1	−1
x_{107}	0	0	0	0	0	0	0	0	0	0
x_{119}	−1	−1	1	0	−1	1	−2	−1	−1	0
x_{120}	0	0	0	0	0	0	0	0	0	0
x_{126}	0	0	0	0	0	0	0	0	0	0
x_{127}	0	0	0	0	0	0	0	0	0	0
x_{150}	−1	−1	−1	0	−1	0	−2	−1	0	−1
x_{151}	−1	−1	0	0	−1	0	−1	0	0	0
x_{152}	0	0	0	0	0	0	0	−1	0	−1
x_{154}	0	0	0	0	0	0	0	0	0	0
x_{156}	0	0	0	0	0	0	0	0	0	0
x_{160}	−1	−1	1	0	−1	1	−1	0	−1	0
x_{170}	0	0	0	0	0	0	0	0	0	0
x_{173}	0	−1	1	0	0	1	−1	0	0	0
x_{178}	−3	−3	−3	−1	−4	0	−1	0	−1	0
x_{179}	0	0	0	0	0	0	0	0	0	0
x_{180}	−2	−2	−5	−1	−3	0	−2	−1	2	−1
x_{182}	0	0	0	0	0	0	0	0	0	0
x_{185}	−1	−1	0	0	−1	1	−1	0	0	0
	x_{3}	x_{5}	x_{9}	x_{10}	x_{14}	x_{16}	x_{20}	x_{23}	x_{27}	x_{28}

	x_{30}	x_{36}	x_{38}	x_{41}	x_{43}	x_{45}	x_{48}	x_{49}	x_{52}	x_{56}
x_{36}	0									
x_{38}	0	−15								
x_{41}	0	−13	2							
x_{43}	0	−1	−14	−20						
x_{45}	0	−3	0	−6	0					
x_{48}	0	−2	3	−4	1	0				
x_{49}	0	−5	0	−4	−1	−10	−1			
x_{52}	0	1	5	−1	6	0	−7	0		
x_{56}	0	−2	0	−2	−1	−4	0	−8	0	
x_{61}	0	−2	0	−2	0	−4	0	−4	0	−2
x_{70}	−5	−2	3	−2	−1	−4	5	−4	0	−2
x_{78}	3	1	−1	1	0	2	−1	2	0	1
x_{85}	2	0	0	0	0	0	0	0	0	0
x_{89}	0	0	0	0	0	0	0	0	−1	0
x_{97}	−1	−1	0	−1	0	−2	0	−2	0	−1
x_{103}	−1	−1	0	−1	0	−1	0	−1	0	−1
x_{106}	−1	−1	1	0	0	−1	2	−1	0	0
x_{107}	0	0	0	0	0	0	0	0	0	0
x_{119}	−1	−1	1	0	0	−1	2	−1	0	0
x_{120}	0	0	0	0	0	0	0	0	0	0
x_{126}	0	0	0	0	0	0	0	0	0	0
x_{127}	0	0	0	0	0	0	0	0	0	0
x_{150}	−2	−1	0	0	0	−1	0	−1	0	0
x_{151}	0	0	0	0	0	−1	0	−1	0	0
x_{152}	0	0	1	0	0	0	1	0	0	0
x_{154}	0	0	0	0	0	0	0	0	0	0
x_{156}	0	0	0	0	0	0	0	−1	0	0
x_{160}	−1	0	1	0	0	−1	1	−1	0	0
x_{170}	0	0	0	0	0	0	0	0	0	0
x_{173}	−1	0	1	0	0	0	1	0	0	0
x_{178}	1	0	0	0	0	−1	0	−1	0	0
x_{179}	0	0	0	0	0	0	0	0	0	0
x_{180}	2	−1	0	0	0	−1	0	−1	0	0
x_{182}	0	0	0	0	0	0	0	0	0	0
x_{185}	−1	0	1	0	0	0	1	−1	0	0

	x_{61}	x_{70}	x_{78}	x_{85}	x_{89}	x_{97}	x_{103}	x_{106}	x_{107}	x_{119}
x_{70}	−4									
x_{78}	2	−19								
x_{85}	0	−1	−8							
x_{89}	0	−1	−1	0						
x_{97}	−2	19	−6	0	0					
x_{103}	−1	−4	−14	−1	0	−1				
x_{106}	−1	15	−4	0	0	0	−1			
x_{107}	0	−1	−1	0	0	0	−3	0		
x_{119}	−1	3	−1	0	−4	−1	0	1	0	
x_{120}	0	0	0	0	0	0	0	0	0	−1
x_{126}	0	0	0	0	0	0	0	0	0	3
x_{127}	0	0	0	0	0	0	0	0	0	−1
x_{150}	−1	0	0	−5	0	0	0	0	0	0
x_{151}	−1	0	0	0	−11	0	0	0	0	9
x_{152}	0	2	0	0	0	0	−1	1	0	1
x_{154}	0	0	0	−1	0	0	0	0	0	0
x_{156}	0	0	0	0	−2	0	0	0	0	0
x_{160}	−1	1	−1	0	−8	−1	0	1	0	46
x_{170}	0	−1	0	0	0	1	0	1	0	0
x_{173}	0	1	0	0	−2	0	0	1	0	34
x_{178}	−1	−9	−67	−3	0	−2	10	−2	0	−1
x_{179}	0	0	12	0	0	−2	−58	0	0	0
x_{180}	−1	−2	−11	−64	−1	−1	−1	−1	0	0
x_{182}	0	0	0	0	−16	0	0	0	0	7
x_{185}	0	1	−1	0	−4	0	0	1	0	39

	x_{120}	x_{126}	x_{127}	x_{150}	x_{151}	x_{152}	x_{154}	x_{156}	x_{160}	x_{170}
x_{126}	0									
x_{127}	0	−1								
x_{150}	0	0	0							
x_{151}	0	2	0	0						
x_{152}	0	0	0	4	0					
x_{154}	0	0	0	1	0	1				
x_{156}	0	0	0	2	−1	1	0			
x_{160}	−1	3	−1	0	25	0	0	0		
x_{170}	0	0	0	0	0	0	0	0	0	
x_{173}	−1	1	0	0	4	0	0	0	20	0
x_{178}	0	0	0	0	0	0	0	0	0	0
x_{179}	0	0	0	0	0	0	0	0	0	0
x_{180}	0	0	0	0	0	0	0	0	0	0
x_{182}	0	2	0	0	10	0	0	−1	20	0
x_{185}	−1	−2	−1	0	17	0	0	0	38	0

x_{178}	0				
x_{179}	0	−14			
x_{180}	0	−4	0		
x_{182}	3	0	0	0	
x_{185}	17	0	0	0	14
	x_{173}	x_{178}	x_{179}	x_{180}	x_{182}

See the related review(s):

τ Branching Fractions

$(\Gamma(\tau^+) - \Gamma(\tau^-)) / (\Gamma(\tau^+) + \Gamma(\tau^-))$

$\tau^\pm \to \pi^\pm K^0_S \nu_\tau$ (RATE DIFFERENCE) / (RATE SUM)

VALUE (%)	DOCUMENT ID		TECN	COMMENT
−0.36±0.23±0.11	LEES	12M	BABR	476 fb^{-1} E^{ee}_{cm} = 10.6 GeV

τ^- BRANCHING RATIOS

$\Gamma(\text{particle}^- \geq 0\ \text{neutrals} \geq 0K^0\nu_\tau\ (\text{“1-prong”}))/\Gamma_{total}$ Γ_1/Γ

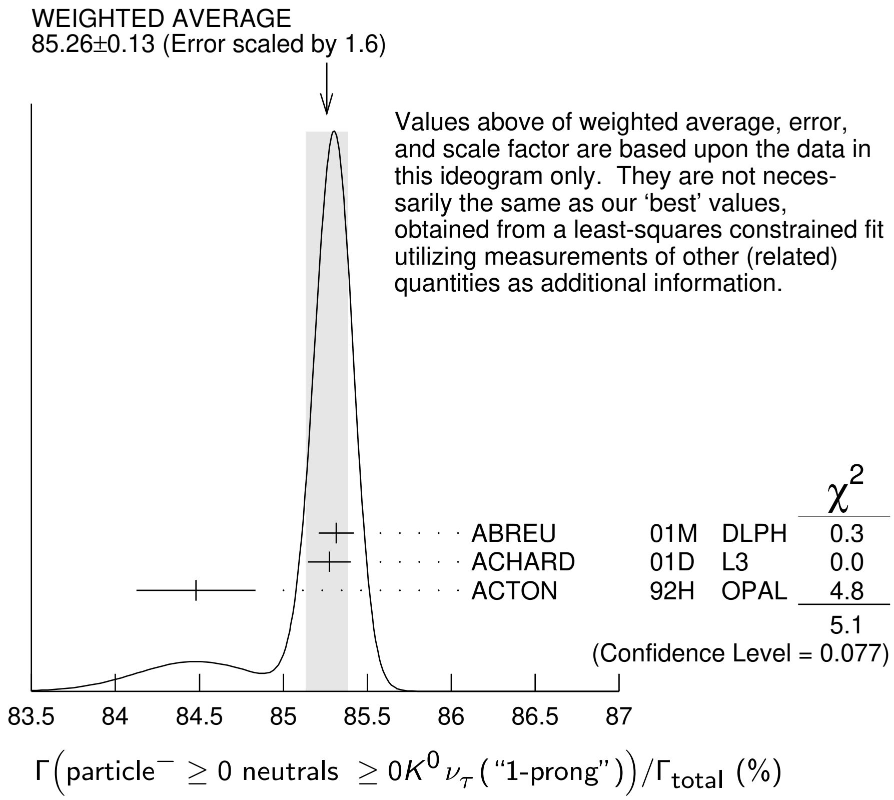
$\Gamma_1/\Gamma = (\Gamma_3+\Gamma_5+\Gamma_9+\Gamma_{10}+\Gamma_{14}+\Gamma_{16}+\Gamma_{20}+\Gamma_{23}+\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+\Gamma_{36}+\Gamma_{38}+\Gamma_{41}+\Gamma_{43}+\Gamma_{45}+\Gamma_{48}+\Gamma_{49}+\Gamma_{50}+\Gamma_{52}+\Gamma_{56}+\Gamma_{57}+0.7196\Gamma_{150}+0.7196\Gamma_{152}+0.7196\Gamma_{154}+0.7196\Gamma_{156}+0.339\Gamma_{170}+0.0835\Gamma_{178}+0.0835\Gamma_{179}+0.0835\Gamma_{180})/\Gamma$

The charged particle here can be e, μ, or hadron. In many analyses, the sum of the topological branching fractions (1, 3, and 5 prongs) is constrained to be unity. Since the 5-prong fraction is very small, the measured 1-prong and 3-prong fractions are highly correlated and cannot be treated as independent quantities in our overall fit. We arbitrarily choose to use the 3-prong fraction in our fit, and leave the 1-prong fraction out. We do, however, use these 1-prong measurements in our average below.

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
85.24 ±0.06 OUR FIT (Produced by HFLAV)					
85.26 ±0.13 OUR AVERAGE Error includes scale factor of 1.6. See the ideogram below.					
• • • We use the following data for averages but not for fits. • • •					
85.316±0.093±0.049	78k	[1] ABREU	01M	DLPH	1992–1995 LEP runs
85.274±0.105±0.073		[2] ACHARD	01D	L3	1992–1995 LEP runs
84.48 ±0.27 ±0.23		ACTON	92H	OPAL	1990–1991 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
85.45 $^{+0.69}_{-0.73}$ ±0.65		DECAMP	92C	ALEP	Repl. by SCHAEL 05C

[1] The correlation coefficients between this measurement and the ABREU 01M measurements of B($\tau \to$ 3-prong) and B($\tau \to$ 5-prong) are −0.98 and −0.08 respectively.

[2] The correlation coefficients between this measurement and the ACHARD 01D measurements of B($\tau \to$ “3-prong”) and B($\tau \to$ “5-prong”) are −0.978 and −0.082 respectively.



$\Gamma\big(\text{particle}^- \geq 0\ \text{neutrals}\ \geq 0K^0_L \nu_\tau\big)/\Gamma_{\text{total}}$ — Γ_2/Γ

$\Gamma_2/\Gamma = (\Gamma_3+\Gamma_5+\Gamma_9+\Gamma_{10}+\Gamma_{14}+\Gamma_{16}+\Gamma_{20}+\Gamma_{23}+\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+0.6534\Gamma_{36}+0.6534\Gamma_{38}+0.6534\Gamma_{41}+0.6534\Gamma_{43}+0.6534\Gamma_{45}+0.0942\Gamma_{48}+0.3069\Gamma_{49}+\Gamma_{50}+0.0942\Gamma_{52}+0.3069\Gamma_{56}+\Gamma_{57}+0.7196\Gamma_{150}+0.7196\Gamma_{152}+0.7196\Gamma_{154}+0.4702\Gamma_{156}+0.1049\Gamma_{170}+0.0835\Gamma_{178}+0.0835\Gamma_{179}+0.0835\Gamma_{180})/\Gamma$

VALUE (%)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
84.58±0.06 OUR FIT	(Produced by HFLAV)				
85.1 ±0.4 OUR AVERAGE					
• • • We use the following data for averages but not for fits. • • •					
85.6 ±0.6 ±0.3	3300	[1] ADEVA	91F	L3	E^{ee}_{cm}= 88.3–94.3 GeV
84.9 ±0.4 ±0.3		BEHREND	89B	CELL	E^{ee}_{cm}= 14–47 GeV
84.7 ±0.8 ±0.6		[2] AIHARA	87B	TPC	E^{ee}_{cm}= 29 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
86.4 ±0.3 ±0.3		ABACHI	89B	HRS	E^{ee}_{cm}= 29 GeV
87.1 ±1.0 ±0.7		[3] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
87.2 ±0.5 ±0.8		SCHMIDKE	86	MRK2	E^{ee}_{cm}= 29 GeV
84.7 ±1.1 $^{+1.6}_{-1.3}$	169	[4] ALTHOFF	85	TASS	E^{ee}_{cm}= 34.5 GeV
86.1 ±0.5 ±0.9		BARTEL	85F	JADE	E^{ee}_{cm}= 34.6 GeV
87.8 ±1.3 ±3.9		[5] BERGER	85	PLUT	E^{ee}_{cm}= 34.6 GeV
86.7 ±0.3 ±0.6		FERNANDEZ	85	MAC	E^{ee}_{cm}= 29 GeV

[1] Not independent of ADEVA 91F $\Gamma(h^- h^- h^+ \geq 0\ \text{neutrals}\ \geq 0K^0_L \nu_\tau)/\Gamma_{\text{total}}$ value.

[2] Not independent of AIHARA 87B $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$, $\Gamma(e^- \overline{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$, and $\Gamma(h^- \geq 0\ \text{neutrals}\ \geq 0K^0_L \nu_\tau)/\Gamma_{\text{total}}$ values.

[3] Not independent of SCHMIDKE 86 value (also not independent of BURCHAT 87 value for $\Gamma(h^- h^- h^+ \geq 0$ neutrals $\geq 0K^0_L \nu_\tau)/\Gamma_{total}$.

[4] Not independent of ALTHOFF 85 $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma_{total}$, $\Gamma(e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$, $\Gamma(h^- \geq 0$ neutrals $\geq 0K^0_L\ \nu_\tau)/\Gamma_{total}$, and $\Gamma(h^- h^- h^+ \geq 0$ neutrals $\geq 0K^0_L \nu_\tau)/\Gamma_{total}$ values.

[5] Not independent of (1-prong + $0\pi^0$) and (1-prong + $\geq 1\pi^0$) values.

$\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau)/\Gamma_{total}$ — Γ_3/Γ

To minimize the effect of experiments with large systematic errors, we exclude experiments which together would contribute 5% of the weight in the average.

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
17.39 ±0.04 OUR FIT (Produced by HFLAV)					
17.33 ±0.05 OUR AVERAGE					
17.319±0.070±0.032	54k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs
17.34 ±0.09 ±0.06	31.4k	ABBIENDI	03	OPAL	1990-1995 LEP runs
17.342±0.110±0.067	21.5k	[2] ACCIARRI	01F	L3	1991-1995 LEP runs
17.325±0.095±0.077	27.7k	ABREU	99X	DLPH	1991-1995 LEP runs
• • • We use the following data for averages but not for fits. • • •					
17.37 ±0.08 ±0.18		[3] ANASTASSOV	97	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
17.31 ±0.11 ±0.05	20.7k	BUSKULIC	96C	ALEP	Repl. by SCHAEL 05C
17.02 ±0.19 ±0.24	6586	ABREU	95T	DLPH	Repl. by ABREU 99X
17.36 ±0.27	7941	AKERS	95I	OPAL	Repl. by ABBIENDI 03
17.6 ±0.4 ±0.4	2148	ADRIANI	93M	L3	Repl. by ACCIARRI 01F
17.4 ±0.3 ±0.5		[4] ALBRECHT	93G	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
17.35 ±0.41 ±0.37		DECAMP	92C	ALEP	1989-1990 LEP runs
17.7 ±0.8 ±0.4	568	BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV
17.4 ±1.0	2197	ADEVA	88	MRKJ	E^{ee}_{cm}= 14–16 GeV
17.7 ±1.2 ±0.7		AIHARA	87B	TPC	E^{ee}_{cm}= 29 GeV
18.3 ±0.9 ±0.8		BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
18.6 ±0.8 ±0.7	558	[5] BARTEL	86D	JADE	E^{ee}_{cm}= 34.6 GeV
12.9 ±1.7 $^{+0.7}_{-0.5}$		ALTHOFF	85	TASS	E^{ee}_{cm}= 34.5 GeV
18.0 ±0.9 ±0.5	473	[5] ASH	85B	MAC	E^{ee}_{cm}= 29 GeV
18.0 ±1.0 ±0.6		[6] BALTRUSAIT...	85	MRK3	E^{ee}_{cm}= 3.77 GeV
19.4 ±1.6 ±1.7	153	BERGER	85	PLUT	E^{ee}_{cm}= 34.6 GeV
17.6 ±2.6 ±2.1	47	BEHREND	83C	CELL	E^{ee}_{cm}= 34 GeV
17.8 ±2.0 ±1.8		BERGER	81B	PLUT	E^{ee}_{cm}= 9–32 GeV

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^-\overline{\nu}_e\nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

[2] The correlation coefficient between this measurement and the ACCIARRI 01F measurement of $B(\tau^- \rightarrow e^-\overline{\nu}_e\nu_\tau)$ is 0.08.

[3] The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(e\overline{\nu}_e\nu_\tau)$, $B(\mu\overline{\nu}_\mu\nu_\tau)/B(e\overline{\nu}_e\nu_\tau)$, $B(h^-\nu_\tau)$, and $B(h^-\nu_\tau)/B(e\overline{\nu}_e\nu_\tau)$ are 0.50, 0.58, 0.50, and 0.08 respectively.

[4] Not independent of ALBRECHT 92D $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau)/\Gamma(e^-\overline{\nu}_e\nu_\tau)$ and ALBRECHT 93G $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau) \times \Gamma(e^-\overline{\nu}_e\nu_\tau)/\Gamma^2_{total}$ values.

[5] Modified using $B(e^-\overline{\nu}_e\nu_\tau)$/B("1 prong") and B("1 prong") ,= 0.855.

[6] Error correlated with BALTRUSAITIS 85 $e\nu\overline{\nu}$ value.

$\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau\gamma)/\Gamma_{total}$ Γ_4/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.367±0.008 OUR AVERAGE					
0.363±0.002±0.015	22k	[1] SHIMIZU	18A	BELL	711 fb^{-1} E^{ee}_{cm}=10.6 GeV
0.369±0.003±0.010	16k	[2] LEES	15G	BABR	431 fb^{-1} E^{ee}_{cm}=10.6 GeV
0.361±0.016±0.035		[3] BERGFELD	00	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.30 ±0.04 ±0.05	116	[4] ALEXANDER	96S	OPAL	1991–1994 LEP runs
0.23 ±0.10	10	[5] WU	90	MRK2	E^{ee}_{cm}= 29 GeV

[1] SHIMIZU 18A impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff E^*_γ > 10 MeV.

[2] LEES 15G impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff E^*_γ > 10 MeV.

[3] BERGFELD 00 impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff $E^*_\gamma > 10$ MeV. For $E^*_\gamma > 20$ MeV, they quote $(3.04\pm0.14\pm0.30)\times10^{-3}$.

[4] ALEXANDER 96S impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff E_γ >20 MeV.

[5] WU 90 reports $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau\gamma)/\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau) = 0.013 \pm 0.006$, which is converted to $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau\gamma)/\Gamma_{total}$ using $\Gamma(\mu^-\overline{\nu}_\mu\nu_\tau\gamma)/\Gamma_{total} = 17.35\%$. Requirements on detected γ's correspond to a τ rest frame energy cutoff E_γ > 37 MeV.

$\Gamma(e^-\overline{\nu}_e\nu_\tau)/\Gamma_{total}$ Γ_5/Γ

To minimize the effect of experiments with large systematic errors, we exclude experiments which together would contribute 5% of the weight in the average.

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
17.82 ±0.04 OUR FIT (Produced by HFLAV)					
17.82 ±0.05 OUR AVERAGE					
17.837±0.072±0.036	56k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs
17.806±0.104±0.076	24.7k	[2] ACCIARRI	01F	L3	1991–1995 LEP runs
17.81 ±0.09 ±0.06	33.1k	ABBIENDI	99H	OPAL	1991–1995 LEP runs
17.877±0.109±0.110	23.3k	ABREU	99X	DLPH	1991–1995 LEP runs
17.76 ±0.06 ±0.17		[3] ANASTASSOV	97	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
17.78 ±0.10 ±0.09	25.3k	ALEXANDER	96D	OPAL	Repl. by ABBIENDI 99H
17.79 ±0.12 ±0.06	20.6k	BUSKULIC	96C	ALEP	Repl. by SCHAEL 05C
17.51 ±0.23 ±0.31	5059	ABREU	95T	DLPH	Repl.. by ABREU 99X
17.9 ±0.4 ±0.4	2892	ADRIANI	93M	L3	Repl. by ACCIARRI 01F
17.5 ±0.3 ±0.5		[4] ALBRECHT	93G	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
17.97 ±0.14 ±0.23	3970	AKERIB	92	CLEO	Repl. by ANASTASSOV 97
19.1 ±0.4 ±0.6	2960	[5] AMMAR	92	CLEO	E^{ee}_{cm}= 10.5–10.9 GeV
18.09 ±0.45 ±0.45		DECAMP	92C	ALEP	Repl. by SCHAEL 05C
17.0 ±0.5 ±0.6	1.7k	ABACHI	90	HRS	E^{ee}_{cm}= 29 GeV
18.4 ±0.8 ±0.4	644	BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV

16.3	±0.3	±3.2			JANSSEN	89	CBAL	E^{ee}_{cm}= 9.4–10.6 GeV
18.4	±1.2	±1.0			AIHARA	87B	TPC	E^{ee}_{cm}= 29 GeV
19.1	±0.8	±1.1			BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
16.8	±0.7	±0.9	515	5	BARTEL	86D	JADE	E^{ee}_{cm}= 34.6 GeV
20.4	±3.0	$^{+1.4}_{-0.9}$			ALTHOFF	85	TASS	E^{ee}_{cm}= 34.5 GeV
17.8	±0.9	±0.6	390	5	ASH	85B	MAC	E^{ee}_{cm}= 29 GeV
18.2	±0.7	±0.5		6	BALTRUSAIT...	85	MRK3	E^{ee}_{cm}= 3.77 GeV
13.0	±1.9	±2.9			BERGER	85	PLUT	E^{ee}_{cm}= 34.6 GeV
18.3	±2.4	±1.9	60		BEHREND	83C	CELL	E^{ee}_{cm}= 34 GeV
16.0	±1.3		459	7	BACINO	78B	DLCO	E^{ee}_{cm}= 3.1–7.4 GeV

[1] Correlation matrix for SCHAEL 05C branching fractions, in percent:

(1) $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$
(2) $\Gamma(\tau^- \to \mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma_{total}$
(3) $\Gamma(\tau^- \to \pi^- \nu_\tau)/\Gamma_{total}$
(4) $\Gamma(\tau^- \to \pi^- \pi^0 \nu_\tau)/\Gamma_{total}$
(5) $\Gamma(\tau^- \to \pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(6) $\Gamma(\tau^- \to \pi^- 3\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(7) $\Gamma(\tau^- \to h^- 4\pi^0 \nu_\tau (\text{ex.}K^0,\eta))/\Gamma_{total}$
(8) $\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0,\omega))/\Gamma_{total}$
(9) $\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(10) $\Gamma(\tau^- \to h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(11) $\Gamma(\tau^- \to h^- h^- h^+ 3\pi^0 \nu_\tau)/\Gamma_{total}$
(12) $\Gamma(\tau^- \to 3h^- 2h^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(13) $\Gamma(\tau^- \to 3h^- 2h^+ \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(2)	-20											
(3)	-9	-6										
(4)	-16	-12	2									
(5)	-5	-5	-17	-37								
(6)	0	-4	-15	2	-27							
(7)	-2	-4	-24	-15	20	-47						
(8)	-14	-9	15	-5	-17	-14	-8					
(9)	-13	-12	-25	-30	4	-2	16	-15				
(10)	0	-2	-23	-14	4	10	13	-6	-17			
(11)	1	0	-5	1	4	6	0	-9	-2	-11		
(12)	0	1	9	4	-8	-4	-6	9	-5	-4	-2	
(13)	1	-4	-3	-5	3	2	-4	-3	-1	4	1	-24

[2] The correlation coefficient between this measurement and the ACCIARRI 01F measurement of B($\tau^- \to \mu^- \overline{\nu}_\mu \nu_\tau$) is 0.08.

[3] The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of B($\mu\overline{\nu}_\mu \nu_\tau$), B($\mu\overline{\nu}_\mu \nu_\tau$)/B($e\overline{\nu}_e \nu_\tau$), B($h^- \nu_\tau$), and B($h^- \nu_\tau$)/B($e\overline{\nu}_e \nu_\tau$) are 0.50, −0.42, 0.48, and −0.39 respectively.

[4] Not independent of ALBRECHT 92D $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma(e^- \overline{\nu}_e \nu_\tau)$ and ALBRECHT 93G $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau) \times \Gamma(e^- \overline{\nu}_e \nu_\tau)/\Gamma^2_{total}$ values.

[5] Modified using B($e^- \overline{\nu}_e \nu_\tau$)/B("1 prong") and B("1 prong") ,= 0.855.

[6] Error correlated with BALTRUSAITIS 85 $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma_{total}$.

[7] BACINO 78B value comes from fit to events with $e^\pm$ and one other nonelectron charged prong.

$\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma(e^- \overline{\nu}_e \nu_\tau)$ — Γ_3/Γ_5

Standard Model prediction including mass effects is 0.9726.

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
97.62±0.28 OUR FIT	(Produced by HFLAV)				
97.9 ±0.4 OUR AVERAGE					
97.96±0.16±0.36	731k	[1] AUBERT	10F	BABR	467 fb^{-1} E^{ee}_{cm}= 10.6 GeV
97.77±0.63±0.87		[2] ANASTASSOV	97	CLEO	E^{ee}_{cm}= 10.6 GeV
99.7 ±3.5 ±4.0		ALBRECHT	92D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

[1] Correlation matrix for AUBERT 10F branching fractions:

(1) $\Gamma(\tau^- \to \mu^- \overline{\nu}_\mu \nu_\tau)$ / $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)$
(2) $\Gamma(\tau^- \to \pi^- \nu_\tau)$ / $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)$
(3) $\Gamma(\tau^- \to K^- \nu_\tau)$ / $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)$

	(1)	(2)
(2)	0.25	
(3)	0.12	0.33

[2] The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \overline{\nu}_\mu \nu_\tau)$, $B(e \overline{\nu}_e \nu_\tau)$, $B(h^- \nu_\tau)$, and $B(h^- \nu_\tau)/B(e \overline{\nu}_e \nu_\tau)$ are 0.58, −0.42, 0.07, and 0.45 respectively.

$\Gamma(e^- \overline{\nu}_e \nu_\tau \gamma)/\Gamma_{total}$ — Γ_6/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.83 ±0.05 OUR AVERAGE					
1.79 ±0.02 ±0.10	12k	[1] SHIMIZU	18A	BELL	711 fb^{-1} E^{ee}_{cm}=10.6 GeV
1.847±0.015±0.052	18k	[2] LEES	15G	BABR	431 fb^{-1} E^{ee}_{cm}=10.6 GeV
1.75 ±0.06 ±0.17		[3] BERGFELD	00	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] SHIMIZU 18A impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff E^*_γ > 10 MeV.

[2] LEES 15G impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff E^*_γ > 10 MeV.

[3] BERGFELD 00 impose requirements on detected γ's corresponding to a τ-rest-frame energy cutoff $E^*_\gamma > 10$ MeV.

$\Gamma(h^- \geq 0 K^0_L \nu_\tau)/\Gamma_{total}$ — Γ_7/Γ

$\Gamma_7/\Gamma = (\Gamma_9+\Gamma_{10}+\frac{1}{2}\Gamma_{36}+\frac{1}{2}\Gamma_{38}+\Gamma_{50})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
12.03±0.05 OUR FIT	(Produced by HFLAV)				
12.2 ±0.4 OUR AVERAGE					
12.47±0.26±0.43	2967	[1] ACCIARRI	95	L3	1992 LEP run
12.4 ±0.7 ±0.7	283	[2] ABREU	92N	DLPH	1990 LEP run
12.1 ±0.7 ±0.5	309	ALEXANDER	91D	OPAL	1990 LEP run
• • • We use the following data for averages but not for fits. • • •					
11.3 ±0.5 ±0.8	798	[3] FORD	87	MAC	E^{ee}_{cm}= 29 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

12.44±0.11±0.11	15k	[4] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
11.7 ±0.6 ±0.8		[5] ALBRECHT	92D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
12.98±0.44±0.33		[6] DECAMP	92C	ALEP	Repl. by SCHAEL 05C
12.3 ±0.9 ±0.5	1338	BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV
11.1 ±1.1 ±1.4		[7] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
12.3 ±0.6 ±1.1	328	[8] BARTEL	86D	JADE	E^{ee}_{cm}= 34.6 GeV
13.0 ±2.0 ±4.0		BERGER	85	PLUT	E^{ee}_{cm}= 34.6 GeV
11.2 ±1.7 ±1.2	34	[9] BEHREND	83C	CELL	E^{ee}_{cm}= 34 GeV

[1] ACCIARRI 95 with 0.65% added to remove their correction for $\pi^- K^0_L$ backgrounds.

[2] ABREU 92N with 0.5% added to remove their correction for $K^*(892)^-$ backgrounds.

[3] FORD 87 result for B($\pi^- \nu_\tau$) with 0.67% added to remove their K^- correction and adjusted for 1992 B("1 prong").

[4] BUSKULIC 96 quote 11.78 ± 0.11 ± 0.13 We add 0.66 to undo their correction for unseen K^0_L and modify the systematic error accordingly.

[5] Not independent of ALBRECHT 92D $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma(e^- \overline{\nu}_e \nu_\tau)$, $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau) \times \Gamma(e^- \overline{\nu}_e \nu_\tau)$, and $\Gamma(h^- \geq 0 K^0_L \nu_\tau)/\Gamma(e^- \overline{\nu}_e \nu_\tau)$ values.

[6] DECAMP 92C quote B($h^- \geq 0 K^0_L \geq 0 (K^0_S \to \pi^+\pi^-) \nu_\tau$) = 13.32 ± 0.44 ± 0.33. We subtract 0.35 to correct for their inclusion of the K^0_S decays.

[7] BURCHAT 87 with 1.1% added to remove their correction for K^- and $K^*(892)^-$ backgrounds.

[8] BARTEL 86D result for B($\pi^- \nu_\tau$) with 0.59% added to remove their K^- correction and adjusted for 1992 B("1 prong").

[9] BEHREND 83C quote B($\pi^- \nu_\tau$) = 9.9 ± 1.7 ± 1.3 after subtracting 1.3 ± 0.5 to correct for B($K^- \nu_\tau$).

$\Gamma(h^- \nu_\tau)/\Gamma_{total}$ $\qquad\Gamma_8/\Gamma = (\Gamma_9+\Gamma_{10})/\Gamma$

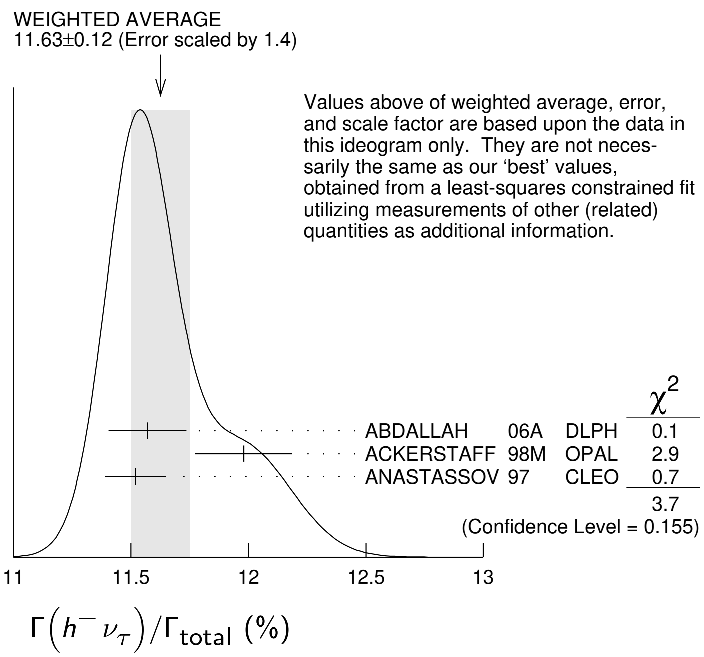
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
11.51 ±0.05 OUR FIT (Produced by HFLAV)				
11.63 ±0.12 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.				
11.571±0.120±0.114	19k	[1] ABDALLAH 06A	DLPH	1992–1995 LEP runs
11.98 ±0.13 ±0.16		ACKERSTAFF 98M	OPAL	1991–1995 LEP runs
11.52 ±0.05 ±0.12		[2] ANASTASSOV 97	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Correlation matrix for ABDALLAH 06A branching fractions, in percent:

(1) $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{total}$
(2) $\Gamma(\tau^- \to h^- \pi^0 \nu_\tau)/\Gamma_{total}$
(3) $\Gamma(\tau^- \to h^- \geq 1\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(4) $\Gamma(\tau^- \to h^- 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(5) $\Gamma(\tau^- \to h^- \geq 3\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{total}$
(6) $\Gamma(\tau^- \to h^- h^- h^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(7) $\Gamma(\tau^- \to h^- h^- h^+ \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(8) $\Gamma(\tau^- \to h^- h^- h^+ \geq 1\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{total}$
(9) $\Gamma(\tau^- \to h^- h^- h^+ \geq 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{total}$
(10) $\Gamma(\tau^- \to 3h^- 2h^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$
(11) $\Gamma(\tau^- \to 3h^- 2h^+ \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(2)	-34									
(3)	-47	56								
(4)	6	-66	15							
(5)	-6	38	11	-86						
(6)	-7	-8	15	0	-2					
(7)	-2	-1	-5	-3	3	-53				
(8)	-4	-4	-13	-4	-2	-56	75			
(9)	-1	-1	-4	3	-6	26	-78	-16		
(10)	-1	-1	1	0	0	-2	-3	-1	3	
(11)	0	0	0	0	0	1	0	-5	5	-57

[2] The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of B($\mu\overline{\nu}_\mu\nu_\tau$), B($e\overline{\nu}_e\nu_\tau$), B($\mu\overline{\nu}_\mu\nu_\tau$)/B($e\overline{\nu}_e\nu_\tau$), and B($h^-\nu_\tau$)/B($e\overline{\nu}_e\nu_\tau$) are 0.50, 0.48, 0.07, and 0.63 respectively.



$\Gamma(h^-\nu_\tau)/\Gamma(e^-\overline{\nu}_e\nu_\tau)$ $\qquad\Gamma_8/\Gamma_5 = (\Gamma_9+\Gamma_{10})/\Gamma_5$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
64.61±0.33 OUR FIT	(Produced by HFLAV)				
64.0 ±0.7 OUR AVERAGE	Error includes scale factor of 1.6.				
• • • We use the following data for averages but not for fits. • • •					
63.33±0.14±0.61	394k	[1] AUBERT	10F	BABR	467 fb^{-1} E^{ee}_{cm}=10.6 GeV
64.84±0.41±0.60		[2] ANASTASSOV	97	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Not independent of AUBERT 10F $\Gamma(\tau^- \to \pi^-\nu_\tau)/\Gamma(\tau^- \to e^-\overline{\nu}_e\nu_\tau)$ and $\Gamma(\tau^- \to K^-\nu_\tau)/\Gamma(\tau^- \to e^-\overline{\nu}_e\nu_\tau)$.

[2] The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of B($\mu\overline{\nu}_\mu\nu_\tau$), B($e\overline{\nu}_e\nu_\tau$), B($\mu\overline{\nu}_\mu\nu_\tau$)/B($e\overline{\nu}_e\nu_\tau$), and B($h^-\nu_\tau$) are 0.08, −0.39, 0.45, and 0.63 respectively.

$\Gamma(\pi^- \nu_\tau)/\Gamma_{total}$ Γ_9/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
10.82 ±0.05 OUR FIT (Produced by HFLAV)					
10.828±0.070±0.078	38k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
11.06 ±0.11 ±0.14		[2] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
11.7 ±0.4 ±1.8	1138	BLOCKER	82D	MRK2	E^{ee}_{cm}= 3.5–6.7 GeV

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.
[2] Not independent of BUSKULIC 96 $B(h^- \nu_\tau)$ and $B(K^- \nu_\tau)$ values.

$\Gamma(\pi^- \nu_\tau)/\Gamma(e^- \overline{\nu}_e \nu_\tau)$ Γ_9/Γ_5

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
60.71±0.32 OUR FIT (Produced by HFLAV)					
59.45±0.14±0.61	369k	[1] AUBERT	10F	BABR	467 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] See footnote to AUBERT 10F $\Gamma(\tau^- \rightarrow \mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)$ for correlations with other measurements.

$\Gamma(K^- \nu_\tau)/\Gamma_{total}$ Γ_{10}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.696±0.010 OUR FIT (Produced by HFLAV)					
0.685±0.023 OUR AVERAGE					
0.658±0.027±0.029		[1] ABBIENDI	01J	OPAL	1990–1995 LEP runs
0.696±0.025±0.014	2032	BARATE	99K	ALEP	1991–1995 LEP runs
0.85 ±0.18	27	ABREU	94K	DLPH	LEP 1992 Z data
0.66 ±0.07 ±0.09	99	BATTLE	94	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.72 ±0.04 ±0.04	728	BUSKULIC	96	ALEP	Repl. by BARATE 99K
0.59 ±0.18	16	MILLS	84	DLCO	E^{ee}_{cm}= 29 GeV
1.3 ±0.5	15	BLOCKER	82B	MRK2	E^{ee}_{cm}= 3.9–6.7 GeV

[1] The correlation coefficient between this measurement and the ABBIENDI 01J $B(\tau^- \rightarrow K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma\ \nu_\tau)$ is 0.60.

$\Gamma(K^- \nu_\tau)/\Gamma(e^- \overline{\nu}_e \nu_\tau)$ Γ_{10}/Γ_5

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.91 ±0.05 OUR FIT (Produced by HFLAV)					
3.882±0.032±0.057	25k	[1] AUBERT	10F	BABR	467 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] See footnote to AUBERT 10F $\Gamma(\tau^- \rightarrow \mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)$ for correlations with other measurements.

$\Gamma(K^- \nu_\tau)/\Gamma(\pi^- \nu_\tau)$ Γ_{10}/Γ_9

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
6.44 ±0.09 OUR FIT (Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •				
6.531±0.056±0.093	[1] AUBERT	10F	BABR	467 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] Not independent of AUBERT 10F $\Gamma(\tau^- \rightarrow \pi^- \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)$ and $\Gamma(\tau^- \rightarrow K^- \nu_\tau)/\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)$.

$\Gamma(h^- \geq 1\,\text{neutrals}\,\nu_\tau)/\Gamma_{\text{total}}$ — Γ_{11}/Γ

$\Gamma_{11}/\Gamma = (\Gamma_{14}+\Gamma_{16}+\Gamma_{20}+\Gamma_{23}+\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+0.15344\Gamma_{36}+0.15344\Gamma_{38}+0.15344\Gamma_{41}+0.15344\Gamma_{43}+0.0942\Gamma_{48}+0.0942\Gamma_{52}+0.7196\Gamma_{150}+0.7196\Gamma_{152}+0.7196\Gamma_{154}+0.1107\Gamma_{156}+0.0835\Gamma_{178}+0.0835\Gamma_{179}+0.0835\Gamma_{180})/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
37.00±0.09 OUR FIT (Produced by HFLAV)				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
36.14±0.33±0.58	[1] AKERS	94E	OPAL	1991–1992 LEP runs
38.4 ±1.2 ±1.0	[2] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
42.7 ±2.0 ±2.9	BERGER	85	PLUT	E^{ee}_{cm}= 34.6 GeV

[1] Not independent of ACKERSTAFF 98M B($h^- \pi^0 \nu_\tau$) and B($h^- \geq 2\pi^0 \nu_\tau$) values.

[2] BURCHAT 87 quote for B($\pi^\pm \geq 1$ neutralν_τ) = $0.378 \pm 0.012 \pm 0.010$. We add 0.006 to account for contribution from ($K^{*-} \nu_\tau$) which they fixed at BR = 0.013.

$\Gamma(h^- \geq 1\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ — Γ_{12}/Γ

$\Gamma_{12}/\Gamma = (\Gamma_{14}+\Gamma_{16}+\Gamma_{20}+\Gamma_{23}+\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+0.3257\Gamma_{150}+0.3257\Gamma_{152}+0.3257\Gamma_{154})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
36.50 ±0.09 OUR FIT (Produced by HFLAV)					
• • • We use the following data for averages but not for fits. • • •					
36.641±0.155±0.127	45k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(h^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — $\Gamma_{13}/\Gamma = (\Gamma_{14}+\Gamma_{16})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
25.93 ±0.09 OUR FIT (Produced by HFLAV)					
25.73 ±0.16 OUR AVERAGE					
25.67 ±0.01 ±0.39	5.4M	FUJIKAWA	08	BELL	72 fb^{-1} E^{ee}_{cm}=10.6GeV
25.740±0.201±0.138	35k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs
25.89 ±0.17 ±0.29		ACKERSTAFF	98M	OPAL	1991–1995 LEP runs
25.05 ±0.35 ±0.50	6613	ACCIARRI	95	L3	1992 LEP run
25.87 ±0.12 ±0.42	51k	[2] ARTUSO	94	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
25.76 ±0.15 ±0.13	31k	BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
25.98 ±0.36 ±0.52		[3] AKERS	94E	OPAL	Repl. by ACKERSTAFF 98M
22.9 ±0.8 ±1.3	283	[4] ABREU	92N	DLPH	E^{ee}_{cm}= 88.2–94.2 GeV
23.1 ±0.4 ±0.9	1249	[5] ALBRECHT	92Q	ARG	E^{ee}_{cm}= 10 GeV
25.02 ±0.64 ±0.88	1849	DECAMP	92C	ALEP	1989–1990 LEP runs
22.0 ±0.8 ±1.9	779	ANTREASYAN	91	CBAL	E^{ee}_{cm}= 9.4–10.6 GeV
22.6 ±1.5 ±0.7	1101	BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV
23.1 ±1.9 ±1.6		BEHREND	84	CELL	E^{ee}_{cm}= 14,22 GeV

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

[2] ARTUSO 94 reports the combined result from three independent methods, one of which (23% of the $\tau^- \to h^- \pi^0 \nu_\tau$) is normalized to the inclusive one-prong branching fraction, taken as 0.854 ± 0.004. Renormalization to the present value causes negligible change.

[3] AKERS 94E quote $(26.25 \pm 0.36 \pm 0.52) \times 10^{-2}$; we subtract 0.27% from their number to correct for $\tau^- \to h^- K^0_L \nu_\tau$.

[4] ABREU 92N with 0.5% added to remove their correction for $K^*(892)^-$ backgrounds.

[5] ALBRECHT 92Q with 0.5% added to remove their correction for $\tau^- \to K^*(892)^- \nu_\tau$ background.

$\Gamma(\pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{14}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
25.49 ±0.09 OUR FIT (Produced by HFLAV)					
25.46 ±0.12 OUR AVERAGE					
25.471±0.097±0.085	81k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs
• • • We use the following data for averages but not for fits. • • •					
25.36 ±0.44		[2] ARTUSO	94	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
25.30 ±0.15 ±0.13		[3] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
21.5 ±0.4 ±1.9	4400	[4,5] ALBRECHT	88L	ARG	E^{ee}_{cm}= 10 GeV
23.0 ±1.3 ±1.7	582	ADLER	87B	MRK3	E^{ee}_{cm}= 3.77 GeV
25.8 ±1.7 ±2.5		[6] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
22.3 ±0.6 ±1.4	629	[5] YELTON	86	MRK2	E^{ee}_{cm}= 29 GeV

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

[2] Not independent of ARTUSO 94 $B(h^- \pi^0 \nu_\tau)$ and BATTLE 94 $B(K^- \pi^0 \nu_\tau)$ values.

[3] Not independent of BUSKULIC 96 $B(h^- \pi^0 \nu_\tau)$ and $B(K^- \pi^0 \nu_\tau)$ values.

[4] The authors divide by $(\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10})/\Gamma = 0.467$ to obtain this result.

[5] Experiment had no hadron identification. Kaon corrections were made, but insufficient information is given to permit their removal.

[6] BURCHAT 87 value is not independent of YELTON 86 value. Nonresonant decays included.

$\Gamma(\pi^- \pi^0 \text{ non-}\rho(770) \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{15}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
0.3±0.1±0.3	[1] BEHREND	84	CELL	E^{ee}_{cm}= 14,22 GeV

[1] BEHREND 84 assume a flat nonresonant mass distribution down to the $\rho(770)$ mass, using events with mass above 1300 to set the level.

$\Gamma(K^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{16}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.433±0.015 OUR FIT (Produced by HFLAV)					
0.426±0.016 OUR AVERAGE					
0.416±0.003±0.018	78k	AUBERT	07AP	BABR	230 fb^{-1} E^{ee}_{cm}= 10.6 GeV
0.471±0.059±0.023	360	ABBIENDI	04J	OPAL	1991-1995 LEP runs
0.444±0.026±0.024	923	BARATE	99K	ALEP	1991-1995 LEP runs
0.51 ±0.10 ±0.07	37	BATTLE	94	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.52 ±0.04 ±0.05	395	BUSKULIC	96	ALEP	Repl. by BARATE 99K

$\Gamma(h^- \geq 2\pi^0 \nu_\tau)/\Gamma_{total}$ Γ_{17}/Γ

$\Gamma_{17}/\Gamma = (\Gamma_{20}+\Gamma_{23}+\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+0.15344\Gamma_{36}+0.15344\Gamma_{38}+0.15344\Gamma_{41}+0.15344\Gamma_{43}+0.09419\Gamma_{48}+0.0942\Gamma_{52}+0.3257\Gamma_{150}+0.3257\Gamma_{152}+0.3257\Gamma_{154})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
10.81±0.09 OUR FIT	(Produced by HFLAV)				
9.91±0.31±0.27		ACKERSTAFF	98M	OPAL	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.89±0.34±0.55		[1] AKERS	94E	OPAL	Repl. by ACKERSTAFF 98M
14.0 ±1.2 ±0.6	938	[2] BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV
12.0 ±1.4 ±2.5		[3] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
13.9 ±2.0 $^{+1.9}_{-2.2}$		[4] AIHARA	86E	TPC	E^{ee}_{cm}= 29 GeV

[1] AKERS 94E not independent of AKERS 94E B($h^- \geq 1\pi^0 \nu_\tau$) and B($h^- \pi^0 \nu_\tau$) measurements.

[2] No independent of BEHREND 90 $\Gamma(h^- 2\pi^0 \nu_\tau$(exp. K^0)) and $\Gamma(h^- \geq 3\pi^0 \nu_\tau)$.

[3] Error correlated with BURCHAT 87 $\Gamma(\rho^- \nu_e)/\Gamma$(total) value.

[4] AIHARA 86E (TPC) quote B($2\pi^0 \pi^- \nu_\tau$) + 1.6B($3\pi^0 \pi^- \nu_\tau$) + 1.1B($\pi^0 \eta \pi^- \nu_\tau$).

$\Gamma(h^- 2\pi^0 \nu_\tau)/\Gamma_{total}$ Γ_{18}/Γ

$\Gamma_{18}/\Gamma = (\Gamma_{20}+\Gamma_{23}+0.15344\Gamma_{36}+0.15344\Gamma_{38})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
9.48±0.10 OUR FIT	(Produced by HFLAV)				
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.48±0.13±0.10	12k	[1] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

[1] BUSKULIC 96 quote 9.29 ± 0.13 ± 0.10. We add 0.19 to undo their correction for $\tau^- \to h^- K^0 \nu_\tau$.

$\Gamma(h^- 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ Γ_{19}/Γ

$\Gamma_{19}/\Gamma = (\Gamma_{20}+\Gamma_{23})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
9.32 ±0.10 OUR FIT	(Produced by HFLAV)				
9.17 ±0.27 OUR AVERAGE					
9.498±0.320±0.275	9.5k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs
8.88 ±0.37 ±0.42	1060	ACCIARRI	95	L3	1992 LEP run
• • • We use the following data for averages but not for fits. • • •					
8.96 ±0.16 ±0.44		[2] PROCARIO	93	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
10.38 ±0.66 ±0.82	809	[3] DECAMP	92C	ALEP	Repl. by SCHAEL 05C
5.7 ±0.5 $^{+1.7}_{-1.0}$	133	[4] ANTREASYAN	91	CBAL	E^{ee}_{cm}= 9.4–10.6 GeV
10.0 ±1.5 ±1.1	333	[5] BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV
8.7 ±0.4 ±1.1	815	[6] BAND	87	MAC	E^{ee}_{cm}= 29 GeV
6.2 ±0.6 ±1.2		[7] GAN	87	MRK2	E^{ee}_{cm}= 29 GeV
6.0 ±3.0 ±1.8		BEHREND	84	CELL	E^{ee}_{cm}= 14,22 GeV

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

[2] PROCARIO 93 entry is obtained from B($h^- 2\pi^0 \nu_\tau$)/B($h^- \pi^0 \nu_\tau$) using ARTUSO 94 result for B($h^- \pi^0 \nu_\tau$).

[3] We subtract 0.0015 to account for $\tau^- \to K^*(892)^- \nu_\tau$ contribution.
[4] ANTREASYAN 91 subtract 0.001 to account for the $\tau^- \to K^*(892)^- \nu_\tau$ contribution.
[5] BEHREND 90 subtract 0.002 to account for the $\tau^- \to K^*(892)^- \nu_\tau$ contribution.
[6] BAND 87 assume $B(\pi^- 3\pi^0 \nu_\tau) = 0.01$ and $B(\pi^- \pi^0 \eta \nu_\tau) = 0.005$.
[7] GAN 87 analysis use photon multiplicity distribution.

$\Gamma(h^- 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma(h^- \pi^0 \nu_\tau)$ — Γ_{19}/Γ_{13}

$\Gamma_{19}/\Gamma_{13} = (\Gamma_{20}+\Gamma_{23})/(\Gamma_{14}+\Gamma_{16})$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
36.0±0.4 OUR FIT	(Produced by HFLAV)			
34.2±0.6±1.6	[1] PROCARIO	93	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV

[1] PROCARIO 93 quote 0.345 ± 0.006 ± 0.016 after correction for 2 kaon backgrounds assuming $B(K^{*-} \nu_\tau)$=1.42 ± 0.18% and $B(h^- K^0 \pi^0 \nu_\tau)$=0.48 ± 0.48%. We multiply by 0.990 ± 0.010 to remove these corrections to $B(h^- \pi^0 \nu_\tau)$.

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{20}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
9.26 ±0.10 OUR FIT	(Produced by HFLAV)				
9.239±0.086±0.090	31k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.21 ±0.13 ±0.11		[2] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.
[2] Not independent of BUSKULIC 96 $B(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ and $B(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ values.

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0), \text{scalar})/\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0))$ — Γ_{21}/Γ_{20}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.094	95	[1] BROWDER	00	CLEO	4.7 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] Model-independent limit from structure function analysis on contribution to $B(\tau^- \to \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ from scalars.

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0), \text{vector})/\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0))$ — Γ_{22}/Γ_{20}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.073	95	[1] BROWDER	00	CLEO	4.7 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] Model-independent limit from structure function analysis on contribution to $B(\tau^- \to \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ from vectors.

$\Gamma(K^- 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{23}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
6.5± 2.2 OUR FIT	(Produced by HFLAV)				
5.8± 2.4 OUR AVERAGE					
5.6± 2.0±1.5	131	BARATE	99K	ALEP	1991–1995 LEP runs
9 ±10 ±3	3	[1] BATTLE	94	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8 ± 2 ±2	59	BUSKULIC	96	ALEP	Repl. by BARATE 99K

[1] BATTLE 94 quote (14 ± 10 ± 3) × 10^{-4} or < 30 × 10^{-4} at 90% CL. We subtract (5 ± 2) × 10^{-4} to account for $\tau^- \to K^- (K^0 \to \pi^0 \pi^0) \nu_\tau$ background.

$\Gamma(h^- \geq 3\pi^0\nu_\tau)/\Gamma_{total}$ — Γ_{24}/Γ

$\Gamma_{24}/\Gamma = (\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+0.15344\Gamma_{41}+0.15344\Gamma_{43}+0.0942\Gamma_{48}+0.0942\Gamma_{52}+0.3257\Gamma_{150}+0.3257\Gamma_{152}+0.3257\Gamma_{154}+0.0501\Gamma_{156})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.34±0.07 OUR FIT	(Produced by HFLAV)				
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.53±0.40±0.46	186	DECAMP	92C	ALEP	Repl. by SCHAEL 05C
3.2 ±1.0 ±1.0		BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV

$\Gamma(h^- \geq 3\pi^0\nu_\tau(\text{ex. } K^0))/\Gamma_{total}$ — Γ_{25}/Γ

$\Gamma_{25}/\Gamma = (\Gamma_{27}+\Gamma_{28}+\Gamma_{30}+0.3257\Gamma_{150}+0.3257\Gamma_{152}+0.3257\Gamma_{154})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.25 ±0.07 OUR FIT	(Produced by HFLAV)				
1.403±0.214±0.224	1.1k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^-\nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

$\Gamma(h^- 3\pi^0\nu_\tau)/\Gamma_{total}$ — Γ_{26}/Γ

$\Gamma_{26}/\Gamma = (\Gamma_{27}+\Gamma_{28}+0.15344\Gamma_{41}+0.15344\Gamma_{43}+0.3257\Gamma_{152})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.18±0.07 OUR FIT	(Produced by HFLAV)				
1.21±0.17 OUR AVERAGE	Error includes scale factor of 1.2.				
1.70±0.24±0.38	293	ACCIARRI	95	L3	1992 LEP run
• • • We use the following data for averages but not for fits. • • •					
1.15±0.08±0.13		[1] PROCARIO	93	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.24±0.09±0.11	2.3k	[2] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
$0.0\ ^{+1.4}_{-0.1}\ ^{+1.1}_{-0.1}$		[3] GAN	87	MRK2	E^{ee}_{cm}= 29 GeV

[1] PROCARIO 93 entry is obtained from $B(h^-3\pi^0\nu_\tau)/B(h^-\pi^0\nu_\tau)$ using ARTUSO 94 result for $B(h^-\pi^0\nu_\tau)$.

[2] BUSKULIC 96 quote $B(h^-3\pi^0\nu_\tau(\text{ex. } K^0))$ = 1.17 ± 0.09 ± 0.11. We add 0.07 to remove their correction for K^0 backgrounds.

[3] Highly correlated with GAN 87 $\Gamma(\eta\pi^-\pi^0\nu_\tau)/\Gamma_{total}$ value. Authors quote $B(\pi^\pm 3\pi^0\nu_\tau) + 0.67B(\pi^\pm\eta\pi^0\nu_\tau) = 0.047 \pm 0.010 \pm 0.011$.

$\Gamma(h^- 3\pi^0\nu_\tau)/\Gamma(h^-\pi^0\nu_\tau)$ — Γ_{26}/Γ_{13}

$\Gamma_{26}/\Gamma_{13} = (\Gamma_{27}+\Gamma_{28}+0.15344\Gamma_{41}+0.15344\Gamma_{43}+0.3257\Gamma_{152})/(\Gamma_{14}+\Gamma_{16})$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
4.54±0.28 OUR FIT	(Produced by HFLAV)			
4.4 ±0.3 ±0.5	[1] PROCARIO	93	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV

[1] PROCARIO 93 quote 0.041 ± 0.003 ± 0.005 after correction for 2 kaon backgrounds assuming $B(K^{*-}\nu_\tau)$=1.42 ± 0.18% and $B(h^-K^0\pi^0\nu_\tau)$=0.48 ± 0.48%. We add 0.003 ± 0.003 and multiply the sum by 0.990 ± 0.010 to remove these corrections.

$\Gamma(\pi^- 3\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.04 ±0.07 OUR FIT	(Produced by HFLAV)				
0.977±0.069±0.058	6.1k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(K^- 3\pi^0 \nu_\tau (\text{ex.}K^0, \eta))/\Gamma_{\text{total}}$ Γ_{28}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.8± 2.1 OUR FIT	(Produced by HFLAV)				
3.7± 2.1±1.1	22	BARATE	99K	ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5 ±13		[1] BUSKULIC	94E	ALEP	Repl. by BARATE 99K

[1] BUSKULIC 94E quote $B(K^- \geq 0\pi^0 \geq 0K^0 \nu_\tau) - [B(K^- \nu_\tau) + B(K^- \pi^0 \nu_\tau) + B(K^- K^0 \nu_\tau) + B(K^- \pi^0 \pi^0 \nu_\tau) + B(K^- \pi^0 K^0 \nu_\tau)] = (5 \pm 13) \times 10^{-4}$ accounting for common systematic errors in BUSKULIC 94E and BUSKULIC 94F measurements of these modes. We assume $B(K^- \geq 2K^0 \nu_\tau)$ and $B(K^- \geq 4\pi^0 \nu_\tau)$ are negligible.

$\Gamma(h^- 4\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ Γ_{29}/Γ

$\Gamma_{29}/\Gamma = (\Gamma_{30}+0.3257\Gamma_{150}+0.3257\Gamma_{154})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.16±0.04 OUR FIT	(Produced by HFLAV)				
0.16±0.05±0.05		[1] PROCARIO	93	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.16±0.04±0.09	232	[2] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

[1] PROCARIO 93 quotes $B(h^- 4\pi^0 \nu_\tau)/B(h^- \pi^0 \nu_\tau) = 0.006 \pm 0.002 \pm 0.002$. We multiply by the ARTUSO 94 result for $B(h^- \pi^0 \nu_\tau)$ to obtain $B(h^- 4\pi^0 \nu_\tau)$. PROCARIO 93 assume $B(h^- \geq 5\ \pi^0 \nu_\tau)$ is small and do not correct for it.

[2] BUSKULIC 96 quote result for $\tau^- \rightarrow h^- \geq 4\pi^0 \nu_\tau$. We assume $B(h^- \geq 5\pi^0 \nu_\tau)$ is negligible.

$\Gamma(h^- 4\pi^0 \nu_\tau (\text{ex.}K^0,\eta))/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.11 ±0.04 OUR FIT	(Produced by HFLAV)				
0.112±0.037±0.035	957	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(a_1(1260)\nu_\tau \rightarrow \pi^- \gamma \nu_\tau)/\Gamma_{\text{total}}$ $\Gamma_{31}/\Gamma = (0.0022\Gamma_{20}+0.0022\Gamma_{70})/\Gamma$

In the fit, $\Gamma(\tau^- \rightarrow a_1(1260)\nu_\tau \rightarrow \pi^- \gamma \nu_\tau)/\Gamma_{\text{total}}$ is set equal to $(\Gamma(\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau (\text{ex.}K^0)) + \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0,\omega))/\Gamma_{\text{total}} \times B(a_1(1260) \rightarrow \pi\gamma)/(1 - B(a_1(1260) \rightarrow \pi\gamma))$ and $B(a_1(1260) \rightarrow \pi\gamma) = \Gamma(a_1(1260) \rightarrow \pi\gamma)/\Gamma^{a_1(1260)}_{\text{total}}$ is a nuisance fit variable with a χ^2 term corresponding to its estimate in reference SCHAEL 05C.

VALUE (units 10^{-4})	DOCUMENT ID
4.0±1.5 OUR FIT	(Produced by HFLAV)

$\Gamma(K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma\, \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{32}/Γ

$\Gamma_{32}/\Gamma = (\Gamma_{10}+\Gamma_{16}+\Gamma_{23}+\Gamma_{28}+\Gamma_{38}+\Gamma_{43}+0.7196\Gamma_{152}+0.1049\Gamma_{170})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.552±0.029 OUR FIT	(Produced by HFLAV)				
1.53 ±0.04 OUR AVERAGE					
1.528±0.039±0.040		[1] ABBIENDI	01J	OPAL	1990–1995 LEP runs
1.54 ±0.24		ABREU	94K	DLPH	LEP 1992 Z data
1.70 ±0.12 ±0.19	202	[2] BATTLE	94	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV
• • • We use the following data for averages but not for fits. • • •					
1.520±0.040±0.041	4006	[3] BARATE	99K	ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.70 ±0.05 ±0.06	1610	[4] BUSKULIC	96	ALEP	Repl. by BARATE 99K
1.6 ±0.4 ±0.2	35	AIHARA	87B	TPC	E^{ee}_{cm}= 29 GeV
1.71 ±0.29	53	MILLS	84	DLCO	E^{ee}_{cm}= 29 GeV

[1] The correlation coefficient between this measurement and the ABBIENDI 01J B($\tau^- \to K^- \nu_\tau$) is 0.60.

[2] BATTLE 94 quote $1.60 \pm 0.12 \pm 0.19$. We add 0.10 ± 0.02 to correct for their rejection of $K^0_S \to \pi^+\pi^-$ decays.

[3] Not independent of BARATE 99K B($K^-\nu_\tau$), B($K^-\pi^0\nu_\tau$), B($K^- 2\pi^0\nu_\tau$ (ex. K^0)), B($K^- 3\pi^0\nu_\tau$ (ex. K^0)), B($K^- K^0\nu_\tau$), and B($K^- K^0\pi^0\nu_\tau$) values.

[4] Not independent of BUSKULIC 96 B($K^-\nu_\tau$), B($K^-\pi^0\nu_\tau$), B($K^- 2\pi^0\nu_\tau$), B($K^- K^0\nu_\tau$), and B($K^- K^0\pi^0\nu_\tau$) values.

$\Gamma(K^- \geq 1\,(\pi^0 \text{ or } K^0 \text{ or } \gamma)\, \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{33}/Γ

$\Gamma_{33}/\Gamma = (\Gamma_{16}+\Gamma_{23}+\Gamma_{28}+\Gamma_{38}+\Gamma_{43}+0.7196\Gamma_{152}+0.7196\Gamma_{154}+0.1049\Gamma_{170})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.859±0.028 OUR FIT	(Produced by HFLAV)				
0.86 ±0.05 OUR AVERAGE					
• • • We use the following data for averages but not for fits. • • •					
0.869±0.031±0.034		[1] ABBIENDI	01J	OPAL	1990–1995 LEP runs
0.69 ±0.25		[2] ABREU	94K	DLPH	LEP 1992 Z data
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.2 ±0.5 $^{+0.2}_{-0.4}$	9	AIHARA	87B	TPC	E^{ee}_{cm}= 29 GeV

[1] Not independent of ABBIENDI 01J B($\tau^- \to K^-\nu_\tau$) and B($\tau^- \to K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma\ \nu_\tau$) values.

[2] Not independent of ABREU 94K B($K^-\nu_\tau$) and B($K^- \geq 0$ neutralsν_τ) measurements.

$\Gamma(K^0_S\,(\text{particles})^-\, \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{34}/Γ

$\Gamma_{34}/\Gamma = (\frac{1}{2}\Gamma_{36}+\frac{1}{2}\Gamma_{38}+\frac{1}{2}\Gamma_{41}+\frac{1}{2}\Gamma_{43}+\frac{1}{2}\Gamma_{45}+\Gamma_{48}+\Gamma_{49}+\Gamma_{52}+\Gamma_{56}+0.3598\Gamma_{156}+0.339\Gamma_{170})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.943±0.028 OUR FIT	(Produced by HFLAV)				
0.918±0.015 OUR AVERAGE					
0.970±0.058±0.062	929	BARATE	98E	ALEP	1991–1995 LEP runs
0.97 ±0.09 ±0.06	141	AKERS	94G	OPAL	E^{ee}_{cm}= 88–94 GeV

• • • We use the following data for averages but not for fits. • • •

$0.915 \pm 0.001 \pm 0.015$	398k	[1] RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV

[1] Not independent of RYU 14 measurements of B($\tau^- \to \pi^- \overline{K}^0 \nu_\tau$), B($\tau^- \to K^- K^0 \nu_\tau$), B($\tau^- \to \pi^- \overline{K}^0 \pi^0 \nu_\tau$), B($\tau^- \to K^- K^0 \pi^0 \nu_\tau$), B($\tau^- \to \pi^- K^0_S K^0_S \nu_\tau$), and B($\tau^- \to \pi^- K^0_S K^0_S \pi^0 \nu_\tau$).

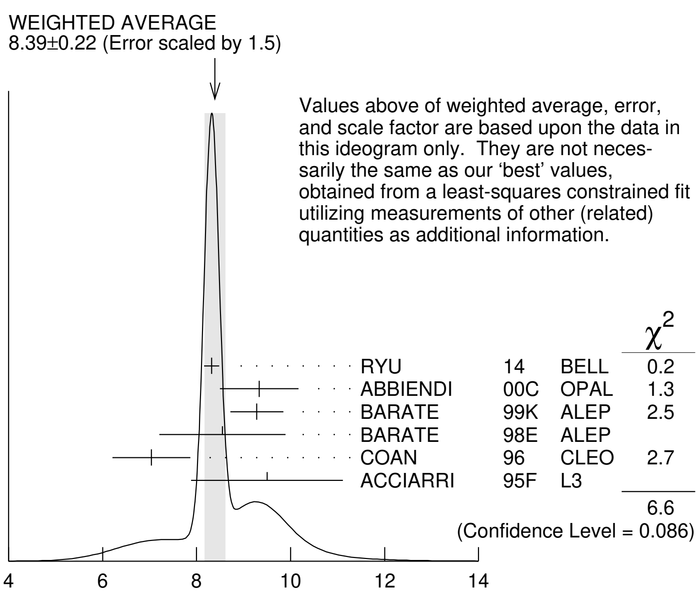
$\Gamma(h^- \overline{K}^0 \nu_\tau)/\Gamma_{total}$ — $\Gamma_{35}/\Gamma = (\Gamma_{36}+\Gamma_{38})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.987±0.014 OUR FIT	(Produced by HFLAV)				
0.90 ±0.07 OUR AVERAGE					
$0.855 \pm 0.036 \pm 0.073$	1242	COAN	96	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We use the following data for averages but not for fits. • • •					
$1.01 \pm 0.11 \pm 0.07$	555	[1] BARATE	98E	ALEP	1991–1995 LEP runs

[1] Not independent of BARATE 98E B($\tau^- \to \pi^- \overline{K}^0 \nu_\tau$) and B($\tau^- \to K^- K^0 \nu_\tau$) values.

$\Gamma(\pi^- \overline{K}^0 \nu_\tau)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
8.38±0.14 OUR FIT	(Produced by HFLAV)				
8.39±0.22 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below.				
$8.32 \pm 0.02 \pm 0.16$	158k	[1] RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV
$9.33 \pm 0.68 \pm 0.49$	377	ABBIENDI	00C	OPAL	1991–1995 LEP runs
$9.28 \pm 0.45 \pm 0.34$	937	[2] BARATE	99K	ALEP	1991–1995 LEP runs
$9.5 \pm 1.5 \pm 0.6$		[3] ACCIARRI	95F	L3	1991–1993 LEP runs
• • • We use the following data for averages but not for fits. • • •					
$8.55 \pm 1.17 \pm 0.66$	509	[4] BARATE	98E	ALEP	1991–1995 LEP runs
$7.04 \pm 0.41 \pm 0.72$		[5] COAN	96	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$8.08 \pm 0.04 \pm 0.26$	53k	EPIFANOV	07	BELL	Repl. by RYU 14
$7.9 \pm 1.0 \pm 0.9$	98	[6] BUSKULIC	96	ALEP	Repl. by BARATE 99K



$\Gamma(\pi^- \overline{K}^0 \nu_\tau)/\Gamma_{total}$ (units 10^{-3})

[1] RYU 14 reconstruct K^0's using $K^0_S \to \pi^+ \pi^-$ decays.

[2] BARATE 99K measure K^0's by detecting K^0_L's in their hadron calorimeter.
[3] ACCIARRI 95F do not identify π^-/K^- and assume B($K^- K^0 \nu_\tau$) = (0.29 ± 0.12)%.
[4] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays. Not independent of BARATE 98E B(K^0 particles$^-$ ν_τ) value.
[5] Not independent of COAN 96 B($h^- K^0 \nu_\tau$) and B($K^- K^0 \nu_\tau$) measurements.
[6] BUSKULIC 96 measure K^0's by detecting K^0_L's in their hadron calorimeter.

$\Gamma(\pi^- \overline{K}^0 (\text{non-}K^*(892)^-) \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{37}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
5.4±2.1		[1] EPIFANOV	07	BELL	351 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<17	95	ACCIARRI	95F	L3	1991–1993 LEP runs

[1] EPIFANOV 07 quote B($\tau^- \to K^*(892)^- \nu_\tau$) B($K^*(892)^- \to K^0_S \pi^-$) / B($\tau^- \to K^0_S \pi^- \nu_\tau$) = 0.933 ± 0.027. We multiply their B($\tau^- \to \overline{K}^0 \pi^- \nu_\tau$) by [1−(0.933 ± 0.027)] to obtain this result.

$\Gamma(K^- K^0 \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{38}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
14.86±0.34 OUR FIT	(Produced by HFLAV)				
14.83±0.35 OUR AVERAGE					
14.78±0.22±0.40	29k	[1] LEES	18B	BABR	468 fb^{-1} E^{ee}_{cm}=10.6 GeV
14.80±0.14±0.54	33k	[2] RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV
16.2 ±2.1 ±1.1	150	[3] BARATE	99K	ALEP	1991–1995 LEP runs
15.8 ±4.2 ±1.7	46	[4] BARATE	98E	ALEP	1991–1995 LEP runs
15.1 ±2.1 ±2.2	111	COAN	96	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
26 ±9 ±2	13	[5] BUSKULIC	96	ALEP	Repl. by BARATE 99K

[1] LEES 18B reconstructs K^0_S's using $K^0_S \to \pi^+\pi^-$ decays.
[2] RYU 14 reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.
[3] BARATE 99K measure K^0's by detecting K^0_L's in their hadron calorimeter.
[4] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.
[5] BUSKULIC 96 measure K^0's by detecting K^0_L's in their hadron calorimeter.

$\Gamma(K^- K^0 \geq 0\pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — $\Gamma_{39}/\Gamma = (\Gamma_{38}+\Gamma_{43})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.299±0.007 OUR FIT	(Produced by HFLAV)				
0.330±0.055±0.039	124	ABBIENDI	00C	OPAL	1991–1995 LEP runs

$\Gamma(h^- \overline{K}^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — $\Gamma_{40}/\Gamma = (\Gamma_{41}+\Gamma_{43})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.532±0.013 OUR FIT	(Produced by HFLAV)				
0.50 ±0.06 OUR AVERAGE	Error includes scale factor of 1.2.				
0.562±0.050±0.048	264	COAN	96	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV
• • • We use the following data for averages but not for fits. • • •					
0.446±0.052±0.046	157	[1] BARATE	98E	ALEP	1991–1995 LEP runs

[1] Not independent of BARATE 98E B($\tau^- \to \pi^- \overline{K}^0 \pi^0 \tau$) and B($\tau^- \to K^- K^0 \pi^0 \nu_\tau$) values.

$\Gamma(\pi^- \overline{K}^0 \pi^0 \nu_\tau)/\Gamma_{total}$ Γ_{41}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.382±0.013 OUR FIT (Produced by HFLAV)					
0.383±0.014 OUR AVERAGE					
0.386±0.004±0.014	27k	[1] RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV
0.347±0.053±0.037	299	[2] BARATE	99K	ALEP	1991–1995 LEP runs
0.294±0.073±0.037	142	[3] BARATE	98E	ALEP	1991–1995 LEP runs
0.41 ±0.12 ±0.03		[4] ACCIARRI	95F	L3	1991–1993 LEP runs
• • • We use the following data for averages but not for fits. • • •					
0.417±0.058±0.044		[5] COAN	96	CLEO	$E^{ee}_{cm}\approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.32 ±0.11 ±0.05	23	[6] BUSKULIC	96	ALEP	Repl. by BARATE 99K

[1] RYU 14 reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.

[2] BARATE 99K measure K^0's by detecting K^0_L's in their hadron calorimeter.

[3] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.

[4] ACCIARRI 95F do not identify π^-/K^- and assume B($K^- K^0 \pi^0 \nu_\tau$) = (0.05 ± 0.05)%.

[5] Not independent of COAN 96 B($h^- K^0 \pi^0 \nu_\tau$) and B($K^- K^0 \pi^0 \nu_\tau$) measurements.

[6] BUSKULIC 96 measure K^0's by detecting K^0_L's in their hadron calorimeter.

$\Gamma(\overline{K}^0 \rho^- \nu_\tau)/\Gamma_{total}$ Γ_{42}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
0.22 ±0.05 OUR AVERAGE				
0.250±0.057±0.044	[1] BARATE	99K	ALEP	1991–1995 LEP runs
0.188±0.054±0.038	[2] BARATE	98E	ALEP	1991–1995 LEP runs

[1] BARATE 99K measure K^0's by detecting K^0_L's in hadron calorimeter. They determine the $\overline{K}^0\rho^-$ fraction in $\tau^- \to \pi^- \overline{K}^0 \pi^0 \nu_\tau$ decays to be (0.72 ± 0.12 ± 0.10) and multiply their B($\pi^- \overline{K}^0 \pi^0 \nu_\tau$) measurement by this fraction to obtain the quoted result.

[2] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays. They determine the $\overline{K}^0\rho^-$ fraction in $\tau^- \to \pi^- \overline{K}^0 \pi^0 \nu_\tau$ decays to be (0.64 ± 0.09 ± 0.10) and multiply their B($\pi^- \overline{K}^0 \pi^0 \nu_\tau$) measurement by this fraction to obtain the quoted result.

$\Gamma(K^- K^0 \pi^0 \nu_\tau)/\Gamma_{total}$ Γ_{43}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
15.0 ±0.7 OUR FIT (Produced by HFLAV)					
14.9 ±0.7 OUR AVERAGE					
14.96±0.20±0.74	8.3k	[1] RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV
14.3 ±2.5 ±1.5	78	[2] BARATE	99K	ALEP	1991–1995 LEP runs
15.2 ±7.6 ±2.1	15	[3] BARATE	98E	ALEP	1991–1995 LEP runs
14.5 ±3.6 ±2.0	32	COAN	96	CLEO	$E^{ee}_{cm}\approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
10 ±5 ±3	5	[4] BUSKULIC	96	ALEP	Repl. by BARATE 99K

[1] RYU 14 reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.

[2] BARATE 99K measure K^0's by detecting K^0_L's in their hadron calorimeter.

[3] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.

[4] BUSKULIC 96 measure K^0's by detecting K^0_L's in their hadron calorimeter.

$\Gamma(\pi^- \overline{K}^0 \geq 1\pi^0 \nu_\tau)/\Gamma_{total}$ $\Gamma_{44}/\Gamma = (\Gamma_{41}+\Gamma_{45})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.408±0.025 OUR FIT	(Produced by HFLAV)				
0.324±0.074±0.066	148	ABBIENDI	00C	OPAL	1991–1995 LEP runs

$\Gamma(\pi^- \overline{K}^0 \pi^0 \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ Γ_{45}/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.26±0.23 OUR FIT			(Produced by HFLAV)			
0.26±0.24			[1] BARATE	99R	ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.66	95	17	[2] BARATE	99K	ALEP	1991–1995 LEP runs
0.58±0.33±0.14		5	[3] BARATE	98E	ALEP	1991–1995 LEP runs

[1] BARATE 99R combine the BARATE 98E and BARATE 99K measurements to obtain this value.

[2] BARATE 99K measure K^0's by detecting K^0_L's in their hadron calorimeter.

[3] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.

$\Gamma(K^- K^0 \pi^0 \pi^0 \nu_\tau)/\Gamma_{total}$ Γ_{46}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.16 × 10⁻³	95	[1] BARATE	99R	ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<0.18 \times 10^{-3}$	95	[2] BARATE	99K	ALEP	1991–1995 LEP runs
$<0.39 \times 10^{-3}$	95	[3] BARATE	98E	ALEP	1991–1995 LEP runs

[1] BARATE 99R combine the BARATE 98E and BARATE 99K bounds to obtain this value.

[2] BARATE 99K measure K^0's by detecting K^0_L's in hadron calorimeter.

[3] BARATE 98E reconstruct K^0's by using $K^0_S \to \pi^+\pi^-$ decays.

$\Gamma(\pi^- K^0 \overline{K}^0 \nu_\tau)/\Gamma_{total}$ $\Gamma_{47}/\Gamma = (\Gamma_{48}+\Gamma_{49}+\Gamma_{50})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.155±0.024 OUR FIT	(Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •					
0.153±0.030±0.016	74	[1] BARATE	98E	ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.31 ±0.12 ±0.04		[2] ACCIARRI	95F	L3	1991–1993 LEP runs

[1] BARATE 98E obtain this value by adding twice their $B(\pi^- K^0_S K^0_S \nu_\tau)$ value to their $B(\pi^- K^0_S K^0_L \nu_\tau)$ value.

[2] ACCIARRI 95F assume $B(\pi^- K^0_S K^0_S \nu) = B(\pi^- K^0_S K^0_L \nu) = 1/2 B(\pi^- K^0_S K^0_L \nu)$.

$\Gamma(\pi^- K^0_S K^0_S \nu_\tau)/\Gamma_{total}$ Γ_{48}/Γ

Bose-Einstein correlations might make the mixing fraction different than 1/4.

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.35±0.06 OUR FIT	(Produced by HFLAV)				
2.32±0.06 OUR AVERAGE					
2.33±0.03±0.09	6.7k	RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV
2.31±0.04±0.08	5.0k	[1] LEES	12Y	BABR	468 fb^{-1} E^{ee}_{cm}=10.6 GeV
2.6 ±1.0 ±0.5	6	BARATE	98E	ALEP	1991–1995 LEP runs
2.3 ±0.5 ±0.3	42	COAN	96	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV

[1] The correlation coefficient between this measurement and the LEES 12Y $\Gamma(\tau^- \to \pi^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ one is 0.0828.

$\Gamma(\pi^- K^0_S K^0_L \nu_\tau)/\Gamma_{total}$ — Γ_{49}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
10.8±2.4 OUR FIT	(Produced by HFLAV)				
10.1±2.3±1.3	68	BARATE	98E	ALEP	1991–1995 LEP runs

$\Gamma(\pi^- K^0_L K^0_L \nu_\tau)/\Gamma_{total}$ — $\Gamma_{50}/\Gamma = \Gamma_{48}/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID
2.35±0.06 OUR FIT	(Produced by HFLAV)

$\Gamma(\pi^- K^0 \overline{K}^0 \pi^0 \nu_\tau)/\Gamma_{total}$ — $\Gamma_{51}/\Gamma = (\Gamma_{52}+\Gamma_{56}+\Gamma_{57})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.6±1.2 OUR FIT	(Produced by HFLAV)			
• • • We use the following data for averages but not for fits. • • •				
3.1±2.3	[1] BARATE	99R	ALEP	1991–1995 LEP runs

[1] BARATE 99R combine BARATE 98E $\Gamma(\pi^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ and $\Gamma(\pi^- K^0_S K^0_L \pi^0 \nu_\tau)/\Gamma_{total}$ measurements to obtain this value.

$\Gamma(\pi^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{52}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.82±0.21 OUR FIT			(Produced by HFLAV)			
1.80±0.21 OUR AVERAGE						
2.00±0.22±0.20		303	RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV
1.60±0.20±0.22		409	[1] LEES	12Y	BABR	468 fb^{-1} E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<20	95		BARATE	98E	ALEP	1991–1995 LEP runs

[1] The correlation coefficient between this measurement and the LEES 12Y $\Gamma(\tau^- \rightarrow \pi^- K^0_S K^0_S \nu_\tau)/\Gamma_{total}$ one is 0.0828.

$\Gamma(K^{*-} K^0 \pi^0 \nu_\tau \rightarrow \pi^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{53}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
10.8±1.4±1.5	RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV

$\Gamma(f_1(1285)\pi^- \nu_\tau \rightarrow \pi^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{54}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
6.8±1.3±0.7	RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV

$\Gamma(f_1(1420)\pi^- \nu_\tau \rightarrow \pi^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{55}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
2.4±0.5±0.6	RYU	14	BELL	669 fb^{-1} E^{ee}_{cm}=10.6 GeV

$\Gamma(\pi^- K^0_S K^0_L \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{56}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.2±1.2 OUR FIT	(Produced by HFLAV)				
3.1±1.1±0.5	11	BARATE	98E	ALEP	1991–1995 LEP runs

$\Gamma(\pi^- K^0_L K^0_L \pi^0 \nu_\tau)/\Gamma_{total}$ $\Gamma_{57}/\Gamma = \Gamma_{52}/\Gamma$

VALUE (units 10^{-5})	DOCUMENT ID
1.82±0.21 OUR FIT	(Produced by HFLAV)

$\Gamma(K^- K^0_S K^0_S \nu_\tau)/\Gamma_{total}$ Γ_{58}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.3 × 10^{-7}	90	LEES	12Y	BABR	468 fb^{-1} E^{ee}_{cm}=10.6 GeV

$\Gamma(K^- K^0_S K^0_S \pi^0 \nu_\tau)/\Gamma_{total}$ Γ_{59}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.0 × 10^{-7}	90	LEES	12Y	BABR	468 fb^{-1} E^{ee}_{cm}=10.6 GeV

$\Gamma(K^0 h^+ h^- h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{total}$ Γ_{60}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
<0.17	95	TSCHIRHART	88	HRS	E^{ee}_{cm}= 29 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.27	90	BELTRAMI	85	HRS	E^{ee}_{cm}= 29 GeV

$\Gamma(K^0 h^+ h^- h^- \nu_\tau)/\Gamma_{total}$ Γ_{61}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.5±2.0 OUR FIT	(Produced by HFLAV)				
2.3±1.9±0.7	6	[1] BARATE	98E	ALEP	1991–1995 LEP runs

[1] BARATE 98E reconstruct K^0's using $K^0_S \to \pi^+\pi^-$ decays.

$\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals } \geq 0 K^0_L \nu_\tau)/\Gamma_{total}$ Γ_{62}/Γ

$\Gamma_{62}/\Gamma = (0.34598\Gamma_{36}+0.34598\Gamma_{38}+0.34598\Gamma_{41}+0.34598\Gamma_{43}+0.4247\Gamma_{48}+0.6920\Gamma_{49}+0.4247\Gamma_{52}+0.6920\Gamma_{56}+0.6534\Gamma_{61}+\Gamma_{70}+\Gamma_{78}+\Gamma_{85}+\Gamma_{86}+\Gamma_{97}+\Gamma_{103}+\Gamma_{106}+\Gamma_{107}+0.2804\Gamma_{150}+0.2804\Gamma_{152}+0.2804\Gamma_{154}+0.2628\Gamma_{156}+0.7259\Gamma_{170}+0.9078\Gamma_{178}+0.9078\Gamma_{179}+0.9078\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
15.20± 0.06 OUR FIT	(Produced by HFLAV)				
14.8 ± 0.4 OUR AVERAGE					
14.4 ± 0.6 ±0.3		ADEVA	91F	L3	E^{ee}_{cm}= 88.3–94.3 GeV
15.0 ± 0.4 ±0.3		BEHREND	89B	CELL	E^{ee}_{cm}= 14–47 GeV
15.1 ± 0.8 ±0.6		AIHARA	87B	TPC	E^{ee}_{cm}= 29 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
13.5 ± 0.3 ±0.3		ABACHI	89B	HRS	E^{ee}_{cm}= 29 GeV
12.8 ± 1.0 ±0.7		[1] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV
12.1 ± 0.5 ±1.2		RUCKSTUHL	86	DLCO	E^{ee}_{cm}= 29 GeV
12.8 ± 0.5 ±0.8	1420	SCHMIDKE	86	MRK2	E^{ee}_{cm}= 29 GeV
15.3 ± 1.1 $^{+1.3}_{-1.6}$	367	ALTHOFF	85	TASS	E^{ee}_{cm}= 34.5 GeV
13.6 ± 0.5 ±0.8		BARTEL	85F	JADE	E^{ee}_{cm}= 34.6 GeV
12.2 ± 1.3 ±3.9		[2] BERGER	85	PLUT	E^{ee}_{cm}= 34.6 GeV
13.3 ± 0.3 ±0.6		FERNANDEZ	85	MAC	E^{ee}_{cm}= 29 GeV
24 ± 6	35	BRANDELIK	80	TASS	E^{ee}_{cm}= 30 GeV

32 ±5	692	[3] BACINO	78B	DLCO	E^{ee}_{cm}= 3.1–7.4 GeV
35 ±11		[3] BRANDELIK	78	DASP	Assumes $V-A$ decay
18 ±6.5	33	[3] JAROS	78	LGW	$E^{ee}_{cm} > 6$ GeV

[1] BURCHAT 87 value is not independent of SCHMIDKE 86 value.
[2] Not independent of BERGER 85 $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)/\Gamma_{total}$, $\Gamma(e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$, $\Gamma(h^- \geq 1$ neutrals$\nu_\tau)/\Gamma_{total}$, and $\Gamma(h^- \geq 0 K^0_L\ \nu_\tau)/\Gamma_{total}$, and therefore not used in the fit.
[3] Low energy experiments are not in average or fit because the systematic errors in background subtraction are judged to be large.

$\Gamma(h^- h^- h^+ \geq 0$ neutrals ν_τ (ex. $K^0_S \to \pi^+\pi^-$)("3-prong"))/Γ_{total} — Γ_{63}/Γ

$\Gamma_{63}/\Gamma = (\Gamma_{70}+\Gamma_{78}+\Gamma_{85}+\Gamma_{86}+\Gamma_{97}+\Gamma_{103}+\Gamma_{106}+\Gamma_{107}+0.2804\Gamma_{150}+0.2804\Gamma_{152}+0.2804\Gamma_{154}+0.491\Gamma_{170}+0.9078\Gamma_{178}+0.9078\Gamma_{179}+0.9078\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
14.55 ±0.06 OUR FIT	(Produced by HFLAV)				
14.61 ±0.06 OUR AVERAGE					
14.556±0.105±0.076		[1] ACHARD	01D	L3	1992–1995 LEP runs
14.96 ±0.09 ±0.22	10.4k	AKERS	95Y	OPAL	1991–1994 LEP runs
• • • We use the following data for averages but not for fits. • • •					
14.652±0.067±0.086		SCHAEL	05C	ALEP	1991–1995 LEP runs
14.569±0.093±0.048	23k	[2] ABREU	01M	DLPH	1992–1995 LEP runs
14.22 ±0.10 ±0.37		[3] BALEST	95C	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
15.26 ±0.26 ±0.22		ACTON	92H	OPAL	Repl. by AKERS 95Y
13.3 ±0.3 ±0.8		[4] ALBRECHT	92D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
14.35 $^{+0.40}_{-0.45}$ ±0.24		DECAMP	92C	ALEP	1989–1990 LEP runs

[1] The correlation coefficients between this measurement and the ACHARD 01D measurements of B($\tau \to$ "1-prong") and B($\tau \to$ "5-prong") are −0.978 and −0.19 respectively.
[2] The correlation coefficients between this measurement and the ABREU 01M measurements of B($\tau \to$ 1-prong) and B($\tau \to$ 5-prong) are −0.98 and −0.08 respectively.
[3] Not independent of BALEST 95C B($h^- h^- h^+ \nu_\tau$) and B($h^- h^- h^+ \pi^0 \nu_\tau$) values, and BORTOLETTO 93 B($h^- h^- h^+ 2\pi^0 \nu_\tau$)/B($h^- h^- h^+ \geq 0$ neutrals ν_τ) value.
[4] This ALBRECHT 92D value is not independent of their $\Gamma(\mu^- \overline{\nu}_\mu \nu_\tau)\Gamma(e^- \overline{\nu}_e \nu_\tau)/\Gamma^2_{total}$ value.

$\Gamma(h^- h^- h^+ \nu_\tau)/\Gamma_{total}$ — Γ_{64}/Γ

$\Gamma_{64}/\Gamma = (0.34598\Gamma_{36}+0.34598\Gamma_{38}+\Gamma_{70}+\Gamma_{97}+\Gamma_{106}+0.491\Gamma_{170}+0.0153\Gamma_{178}+0.0153\Gamma_{179})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
9.80±0.05 OUR FIT	(Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •					
7.6 ±0.1 ±0.5	7.5k	[1] ALBRECHT	96E	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.92±0.10±0.09	11.2k	[2] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
9.49±0.36±0.63		DECAMP	92C	ALEP	Repl. by SCHAEL 05C
8.7 ±0.7 ±0.3	694	[3] BEHREND	90	CELL	E^{ee}_{cm}= 35 GeV
7.0 ±0.3 ±0.7	1566	[4] BAND	87	MAC	E^{ee}_{cm}= 29 GeV
6.7 ±0.8 ±0.9		[5] BURCHAT	87	MRK2	E^{ee}_{cm}= 29 GeV

6.4 ±0.4 ±0.9		[6] RUCKSTUHL	86	DLCO	E^{ee}_{cm}= 29 GeV
7.8 ±0.5 ±0.8	890	SCHMIDKE	86	MRK2	E^{ee}_{cm}= 29 GeV
8.4 ±0.4 ±0.7	1255	[6] FERNANDEZ	85	MAC	E^{ee}_{cm}= 29 GeV
9.7 ±2.0 ±1.3		BEHREND	84	CELL	E^{ee}_{cm}= 14,22 GeV

[1] ALBRECHT 96E not independent of ALBRECHT 93C $\Gamma(h^- h^- h^+ \nu_\tau (\text{ex. } K^0) \times \Gamma(\text{particle}^- \geq 0 \text{ neutrals } \geq 0 K^0_L \nu_\tau)/\Gamma^2_{\text{total}}$ value.

[2] BUSKULIC 96 quote $B(h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) = 9.50 \pm 0.10 \pm 0.11$. We add 0.42 to remove their K^0 correction and reduce the systematic error accordingly.

[3] BEHREND 90 subtract 0.3% to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution to measured events.

[4] BAND 87 subtract for charged kaon modes; not independent of FERNANDEZ 85 value.

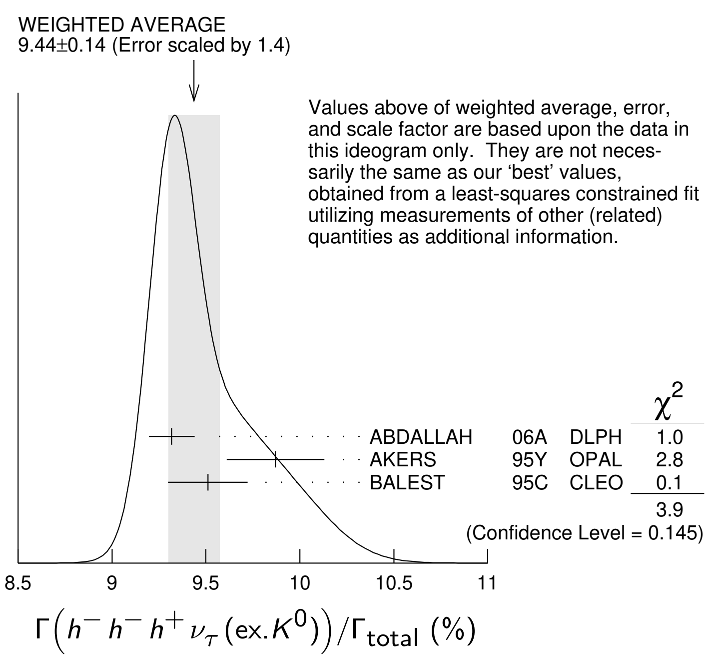
[5] BURCHAT 87 value is not independent of SCHMIDKE 86 value.

[6] Value obtained by multiplying paper's $R = B(h^- h^- h^+ \nu_\tau)/B(\text{3-prong})$ by B(3-prong) = 0.143 and subtracting 0.3% for $K^*(892)$ background.

$\Gamma(h^- h^- h^+ \nu_\tau (\text{ex.} K^0))/\Gamma_{\text{total}}$ — Γ_{65}/Γ

$\Gamma_{65}/\Gamma = (\Gamma_{70}+\Gamma_{97}+\Gamma_{106}+0.491\Gamma_{170}+0.0153\Gamma_{178}+0.0153\Gamma_{179})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
9.46 ±0.05 OUR FIT	(Produced by HFLAV)				
9.44 ±0.14 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.				
9.317±0.090±0.082	12.2k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs
9.51 ±0.07 ±0.20	37.7k	BALEST	95C	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We use the following data for averages but not for fits. • • •					
9.87 ±0.10 ±0.24		[2] AKERS	95Y	OPAL	1991–1994 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
9.50 ±0.10 ±0.11	11.2k	[3] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C



[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

[2] Not independent of AKERS 95Y $B(h^- h^- h^+ \geq 0 \text{ neutrals} \nu_\tau (\text{ex. } K^0_S \rightarrow \pi^+ \pi^-))$ and $B(h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/B(h^- h^- h^+ \geq 0 \text{ neutrals} \nu_\tau (\text{ex. } K^0_S \rightarrow \pi^+ \pi^-))$ values.

[3] Not independent of BUSKULIC 96 $B(h^- h^- h^+ \nu_\tau)$ value.

$\Gamma\big(h^- h^- h^+ \nu_\tau (\text{ex.}K^0)\big)/\Gamma\big(h^- h^- h^+ \geq 0\ \text{neutrals}\ \nu_\tau (\text{ex. } K^0_S \to \pi^+\pi^-)\ (\text{“3-prong”})\big)$ — Γ_{65}/Γ_{63}

$\Gamma_{65}/\Gamma_{63} = (\Gamma_{70}+\Gamma_{97}+\Gamma_{106}+0.491\Gamma_{170}+0.0153\Gamma_{178}+0.0153\Gamma_{179})/(0.4247\Gamma_{52}+\Gamma_{70}+\Gamma_{78}+\Gamma_{85}+\Gamma_{89}+\Gamma_{97}+\Gamma_{103}+\Gamma_{106}+\Gamma_{107}+0.2804\Gamma_{150}+0.2302\Gamma_{151}+0.2804\Gamma_{152}+0.2804\Gamma_{154}+0.1131\Gamma_{156}+0.3257\Gamma_{160}+0.491\Gamma_{170}+0.9078\Gamma_{178}+0.9078\Gamma_{179}+0.9078\Gamma_{180}+0.892\Gamma_{182})$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
64.98±0.31 OUR FIT (Produced by HFLAV)				
66.0 ±0.4 ±1.4	AKERS	95Y	OPAL	1991–1994 LEP runs

$\Gamma\big(h^- h^- h^+ \nu_\tau (\text{ex.}K^0,\omega)\big)/\Gamma_{\text{total}}$ — Γ_{66}/Γ

$\Gamma_{66}/\Gamma = (\Gamma_{70}+\Gamma_{97}+\Gamma_{106}+0.491\Gamma_{170})/\Gamma$

VALUE (%)	DOCUMENT ID
9.43±0.05 OUR FIT (Produced by HFLAV)	

$\Gamma\big(\pi^- \pi^+ \pi^- \nu_\tau\big)/\Gamma_{\text{total}}$ — $\Gamma_{67}/\Gamma = (0.34598\Gamma_{36}+\Gamma_{70}+0.0153\Gamma_{178})/\Gamma$

VALUE (%)	DOCUMENT ID
9.31±0.05 OUR FIT (Produced by HFLAV)	

$\Gamma\big(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0)\big)/\Gamma_{\text{total}}$ — $\Gamma_{68}/\Gamma = (\Gamma_{70}+0.0153\Gamma_{178})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
9.02±0.05 OUR FIT (Produced by HFLAV)					
8.77±0.13 OUR AVERAGE Error includes scale factor of 1.1.					
$8.42\pm0.00^{+0.26}_{-0.25}$	8.9M	[1] LEE	10	BELL	666 fb^{-1} $E^{ee}_{\text{cm}} = 10.6$ GeV
$8.83\pm0.01\pm0.13$	1.6M	[2] AUBERT	08	BABR	342 fb^{-1} $E^{ee}_{\text{cm}} = 10.6$ GeV
$9.13\pm0.05\pm0.46$	43k	[3] BRIERE	03	CLE3	$E^{ee}_{\text{cm}} = 10.6$ GeV

[1] Quoted statistical error is 0.003%. Correlation matrix for LEE 10 branching fractions:
(1) $\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$
(2) $\Gamma(\tau^- \to K^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$
(3) $\Gamma(\tau^- \to K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$
(4) $\Gamma(\tau^- \to K^- K^+ K^- \nu_\tau)/\Gamma_{\text{total}}$

	(1)	(2)	(3)
(2)	0.175		
(3)	0.049	0.080	
(4)	-0.053	0.035	-0.008

[2] Correlation matrix for AUBERT 08 branching fractions:
(1) $\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$
(2) $\Gamma(\tau^- \to K^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$
(3) $\Gamma(\tau^- \to K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$
(4) $\Gamma(\tau^- \to K^- K^+ K^- \nu_\tau)/\Gamma_{\text{total}}$

	(1)	(2)	(3)
(2)	0.544		
(3)	0.390	0.177	
(4)	0.031	0.093	0.087

[3] 47% correlated with BRIERE 03 $\tau^- \to K^- \pi^+ \pi^- \nu_\tau$ and 71% correlated with $\tau^- \to K^- K^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

$\Gamma(\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0), \text{non-axial vector})/\Gamma(\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ Γ_{69}/Γ_{68}

$\Gamma_{69}/\Gamma_{68} = \Gamma_{69}/(\Gamma_{70}+0.0153\Gamma_{177})$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.261	95	[1] ACKERSTAFF 97R	OPAL	1992–1994 LEP runs

[1] Model-independent limit from structure function analysis on contribution to B($\tau^- \to \pi^-\pi^+\pi^-\nu_\tau$(ex. K^0)) from non-axial vectors.

$\Gamma(\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0,\omega))/\Gamma_{\text{total}}$ Γ_{70}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
8.99 ±0.05 OUR FIT (Produced by HFLAV)				
9.041±0.060±0.076	29k	[1] SCHAEL 05C	ALEP	1991-1995 LEP runs

[1] See footnote to SCHAEL 05C $\Gamma(\tau^- \to e^-\overline{\nu}_e\nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(h^-h^-h^+ \geq 1 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{71}/Γ

$\Gamma_{71}/\Gamma = (0.34598\Gamma_{41}+0.34598\Gamma_{43}+0.4247\Gamma_{48}+0.4247\Gamma_{52}+\Gamma_{78}+\Gamma_{85}+\Gamma_{86}+\Gamma_{103}+\Gamma_{107}+0.2804\Gamma_{150}+0.2804\Gamma_{152}+0.2804\Gamma_{154}+0.2926\Gamma_{156}+0.892\Gamma_{178}+0.892\Gamma_{179}+0.9078\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
5.29±0.05 OUR FIT (Produced by HFLAV)				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.6 ±0.7 ±0.3	352	[1] BEHREND 90	CELL	E^{ee}_{cm}= 35 GeV
4.2 ±0.5 ±0.9	203	[2] ALBRECHT 87L	ARG	E^{ee}_{cm}= 10 GeV
6.1 ±0.8 ±0.9		[3] BURCHAT 87	MRK2	E^{ee}_{cm}= 29 GeV
7.6 ±0.4 ±0.9		[4,5] RUCKSTUHL 86	DLCO	E^{ee}_{cm}= 29 GeV
4.7 ±0.5 ±0.8	530	[6] SCHMIDKE 86	MRK2	E^{ee}_{cm}= 29 GeV
5.6 ±0.4 ±0.7		[5] FERNANDEZ 85	MAC	E^{ee}_{cm}= 29 GeV
6.2 ±2.3 ±1.7		BEHREND 84	CELL	E^{ee}_{cm}= 14,22 GeV

[1] BEHREND 90 value is not independent of BEHREND 90 B($3h\nu_\tau \geq 1$ neutrals) + B(5-prong).
[2] ALBRECHT 87L measure the product of branching ratios B($3\pi^\pm\pi^0\nu_\tau$) B($(e\overline{\nu}$ or $\mu\overline{\nu}$ or π or K or $\rho)\nu_\tau$) = 0.029 and use the PDG 86 values for the second branching ratio which sum to 0.69 ± 0.03 to get the quoted value.
[3] BURCHAT 87 value is not independent of SCHMIDKE 86 value.
[4] Contributions from kaons and from $>1\pi^0$ are subtracted. Not independent of (3-prong + $0\pi^0$) and (3-prong + $\geq 0\pi^0$) values.
[5] Value obtained using paper's R = B($h^-h^-h^+\nu_\tau$)/B(3-prong) and current B(3-prong) = 0.143.
[6] Not independent of SCHMIDKE 86 $h^-h^-h^+\nu_\tau$ and $h^-h^-h^+(\geq 0\pi^0)\nu_\tau$ values.

$\Gamma(h^-h^-h^+ \geq 1\pi^0\nu_\tau(\text{ex. }K^0))/\Gamma_{\text{total}}$ Γ_{72}/Γ

$\Gamma_{72}/\Gamma = (\Gamma_{78}+\Gamma_{85}+\Gamma_{86}+\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{150}+0.2302\Gamma_{152}+0.2302\Gamma_{154}+0.892\Gamma_{178}+0.892\Gamma_{179}+0.9078\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
5.09 ±0.05 OUR FIT (Produced by HFLAV)				
5.10 ±0.12 OUR AVERAGE				

• • • We use the following data for averages but not for fits. • • •

5.106±0.083±0.103	10.1k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs
5.09 ±0.10 ±0.23		[2] AKERS	95Y	OPAL	1991–1994 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

4.95 ±0.29 ±0.65	570	DECAMP	92C	ALEP	Repl. by SCHAEL 05C

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

[2] Not independent of AKERS 95Y B($h^- h^- h^+ \geq 0$ neutralsν_τ (ex. $K^0_S \to \pi^+\pi^-$)) and B($h^- h^- h^+ \geq 0$ neutralsν_τ (ex. K^0))/B($h^- h^- h^+ \geq 0$ neutralsν_τ (ex. $K^0_S \to \pi^+\pi^-$)) values.

$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{73}/Γ

$\Gamma_{73}/\Gamma = (0.34598\Gamma_{41}+0.34598\Gamma_{43}+\Gamma_{78}+\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{152}+0.892\Gamma_{178}+0.892\Gamma_{179}+0.0153\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
4.76±0.05 OUR FIT	(Produced by HFLAV)				
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.45±0.09±0.07	6.1k	[1] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

[1] BUSKULIC 96 quote B($h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0)) = 4.30 ± 0.09 ± 0.09. We add 0.15 to remove their K^0 correction and reduce the systematic error accordingly.

$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex.} K^0))/\Gamma_{total}$ — Γ_{74}/Γ

$\Gamma_{74}/\Gamma = (\Gamma_{78}+\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{152}+0.892\Gamma_{178}+0.892\Gamma_{179}+0.0153\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
4.57 ±0.05 OUR FIT	(Produced by HFLAV)				
4.45 ±0.14 OUR AVERAGE	Error includes scale factor of 1.2.				
4.545±0.106±0.103	8.9k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs
4.23 ±0.06 ±0.22	7.2k	BALEST	95C	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0, \omega))/\Gamma_{total}$

$\Gamma_{75}/\Gamma = (\Gamma_{78}+\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{152})/\Gamma$

VALUE (%)	DOCUMENT ID
2.79±0.07 OUR FIT	(Produced by HFLAV)

$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{76}/Γ

$\Gamma_{76}/\Gamma = (0.34598\Gamma_{41}+\Gamma_{78}+0.892\Gamma_{178}+0.0153\Gamma_{180})/\Gamma$

VALUE (%)	DOCUMENT ID
4.62±0.05 OUR FIT	(Produced by HFLAV)

$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex.} K^0))/\Gamma_{total}$ — Γ_{77}/Γ

$\Gamma_{77}/\Gamma = (\Gamma_{78}+0.892\Gamma_{178}+0.0153\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
4.49 ±0.05 OUR FIT	(Produced by HFLAV)			
4.55 ±0.13 OUR AVERAGE	Error includes scale factor of 1.6.			

4.598±0.057±0.064	16k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs
4.19 ±0.10 ±0.21		[2] EDWARDS	00A	CLEO	4.7 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] SCHAEL 05C quote (4.590±0.057±0.064)%. We add 0.008% to remove their correction for $\tau^- \to \pi^-\pi^0\omega\nu_\tau \to \pi^-\pi^0\pi^+\pi^-\nu_\tau$ decays. See footnote to SCHAEL 05C $\Gamma(\tau^- \to e^-\overline{\nu}_e\nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.
[2] EDWARDS 00A quote (4.19 ± 0.10) × 10^{-2} with a 5% systematic error.

$\Gamma(\pi^-\pi^+\pi^-\pi^0\nu_\tau(\text{ex.}K^0,\omega))/\Gamma_{total}$ — Γ_{78}/Γ

VALUE (%)	DOCUMENT ID
2.74±0.07 OUR FIT	(Produced by HFLAV)

$\Gamma(h^-\rho\pi^0\nu_\tau)/\Gamma(h^-h^-h^+\pi^0\nu_\tau)$ — Γ_{79}/Γ_{73}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.30±0.04±0.02	393	ALBRECHT	91D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

$\Gamma(h^-\rho^+h^-\nu_\tau)/\Gamma(h^-h^-h^+\pi^0\nu_\tau)$ — Γ_{80}/Γ_{73}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.10±0.03±0.04	142	ALBRECHT	91D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

$\Gamma(h^-\rho^-h^+\nu_\tau)/\Gamma(h^-h^-h^+\pi^0\nu_\tau)$ — Γ_{81}/Γ_{73}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.26±0.05±0.01	370	ALBRECHT	91D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

$\Gamma(h^-h^-h^+ \geq 2\pi^0\nu_\tau(\text{ex. }K^0))/\Gamma_{total}$ — Γ_{82}/Γ

$\Gamma_{82}/\Gamma = (\Gamma_{85}+\Gamma_{86}+0.2302\Gamma_{150}+0.2302\Gamma_{154}+0.892\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.517±0.031 OUR FIT	(Produced by HFLAV)				
0.561±0.068±0.095	1.3k	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^-\nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

$\Gamma(h^-h^-h^+2\pi^0\nu_\tau)/\Gamma_{total}$ — Γ_{83}/Γ

$\Gamma_{83}/\Gamma = (0.4247\Gamma_{48}+\Gamma_{85}+0.2302\Gamma_{150}+0.2302\Gamma_{154}+0.892\Gamma_{180})/\Gamma$

VALUE (%)	DOCUMENT ID
0.505±0.031 OUR FIT	(Produced by HFLAV)

$\Gamma(h^-h^-h^+2\pi^0\nu_\tau(\text{ex.}K^0))/\Gamma_{total}$ — Γ_{84}/Γ

$\Gamma_{84}/\Gamma = (\Gamma_{85}+0.2302\Gamma_{150}+0.2302\Gamma_{154}+0.892\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.495±0.031 OUR FIT	(Produced by HFLAV)				
0.435±0.030±0.035	2.6k	[1] SCHAEL	05C	ALEP	1991-1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.50 ±0.07 ±0.07	1.8k	BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

[1] SCHAEL 05C quote (0.392 ± 0.030 ± 0.035)%. We add 0.043% to remove their correction for $\tau^- \rightarrow \pi^- \eta \pi^0 \nu_\tau \rightarrow \pi^- \pi^+ \pi^- 2\pi^0 \nu_\tau$ and $\tau^- \rightarrow K^*(892)^- \eta \nu_\tau \rightarrow K^- \pi^+ \pi^- 2\pi^0 \nu_\tau$ decays. See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K^0_L \nu_\tau)$ Γ_{84}/Γ_{62}

$\Gamma_{84}/\Gamma_{62} = (\Gamma_{85}+0.2302\Gamma_{150}+0.2302\Gamma_{154}+0.892\Gamma_{180})/(0.34598\Gamma_{36}+0.34598\Gamma_{38}+0.34598\Gamma_{41}+0.34598\Gamma_{43}+0.4247\Gamma_{48}+0.6920\Gamma_{49}+0.8494\Gamma_{52}+0.6920\Gamma_{56}+0.6534\Gamma_{61}+\Gamma_{70}+\Gamma_{78}+\Gamma_{85}+\Gamma_{89}+\Gamma_{97}+\Gamma_{103}+\Gamma_{106}+\Gamma_{107}+0.2804\Gamma_{150}+0.2302\Gamma_{151}+0.2804\Gamma_{152}+0.2804\Gamma_{154}+0.3759\Gamma_{156}+0.3257\Gamma_{160}+0.7259\Gamma_{170}+0.9078\Gamma_{178}+0.9078\Gamma_{179}+0.9078\Gamma_{180}+0.892\Gamma_{182})$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID	TECN	COMMENT
3.26±0.20 OUR FIT	(Produced by HFLAV)			
3.4 ±0.2 ±0.3	668	BORTOLETTO93	CLEO	$E^{ee}_{cm} \approx 10.6$ GeV

$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex.}K^0,\omega,\eta))/\Gamma_{total}$ Γ_{85}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
10±4 OUR FIT	(Produced by HFLAV)

$\Gamma(h^- h^- h^+ 3\pi^0 \nu_\tau)/\Gamma_{total}$ $\Gamma_{86}/\Gamma = (0.4247\Gamma_{52}+\Gamma_{87}+0.1131\Gamma_{156})/\Gamma$

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.13±0.30 OUR FIT			(Produced by HFLAV)			
2.2 ±0.3 ±0.4		139	ANASTASSOV	01	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 4.9	95		SCHAEL	05C	ALEP	1991-1995 LEP runs
2.85±0.56±0.51		57	ANDERSON	97	CLEO	Repl. by ANASTASSOV 01
11 ±4 ±5		440	[1] BUSKULIC	96	ALEP	Repl. by SCHAEL 05C

[1] BUSKULIC 96 state their measurement is for B($h^- h^- h^+ \geq 3\pi^0 \nu_\tau$). We assume that B($h^- h^- h^+ \geq 4\pi^0 \nu_\tau$) is very small.

$\Gamma(2\pi^- \pi^+ 3\pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ Γ_{87}/Γ

$\Gamma_{87}/\Gamma = (\Gamma_{89}+0.2302\Gamma_{151}+0.3257\Gamma_{160}+0.892\Gamma_{182})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.94±0.30 OUR FIT	(Produced by HFLAV)			
• • • We use the following data for averages but not for fits. • • •				
2.07±0.18±0.37	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] Not independent of LEES 12X $\Gamma(\tau^- \rightarrow \eta \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma$, $\Gamma(\tau^- \rightarrow \eta \pi^- \pi^0 \pi^0 \nu_\tau)/\Gamma$, $\Gamma(\tau^- \rightarrow \pi^- \omega 2\pi^0 \nu_\tau)/\Gamma$, and $\Gamma(\tau^- \rightarrow f_1(1285) \pi^- \nu_\tau \rightarrow \eta \pi^- \pi^+ \pi^- \nu_\tau)/\Gamma$ values.

$\Gamma(2\pi^- \pi^+ 3\pi^0 \nu_\tau (\text{ex.}K^0, \eta, f_1(1285)))/\Gamma_{total}$ Γ_{88}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.69±0.08±0.43	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(2\pi^- \pi^+ 3\pi^0 \nu_\tau (\text{ex.}K^0, \eta, \omega, f_1(1285)))/\Gamma_{\text{total}}$ Γ_{89}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.4±2.7 OUR FIT	(Produced by HFLAV)			
1.0±0.8±3.0	[1] LEES	12X	BABR	468 fb^{-1} $E^{ee}_{\text{cm}} = 10.6$ GeV

[1] LEES 12X meaurement corresponds to the lower limit of $< 5.8 \times 10^{-5}$ at 90% CL.

$\Gamma(K^- h^+ h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{90}/Γ

$\Gamma_{90}/\Gamma = (0.34598\Gamma_{38}+0.34598\Gamma_{43}+\Gamma_{97}+\Gamma_{103}+\Gamma_{106}+\Gamma_{107}+0.2804\Gamma_{152}+0.491\Gamma_{170}+0.9078\Gamma_{179})/\Gamma$

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
0.629±0.014 OUR FIT	(Produced by HFLAV)				
<0.6	90	AIHARA	84C	TPC	$E^{ee}_{\text{cm}} = 29$ GeV

$\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ $\Gamma_{91}/\Gamma = (\Gamma_{97}+\Gamma_{106}+0.0153\Gamma_{179})/\Gamma$

VALUE (%)	DOCUMENT ID
0.437±0.007 OUR FIT	(Produced by HFLAV)

$\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ Γ_{91}/Γ_{68}

$\Gamma_{91}/\Gamma_{68} = (\Gamma_{97}+\Gamma_{106}+0.0153\Gamma_{179})/(\Gamma_{70}+0.0153\Gamma_{178})$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
4.84±0.08 OUR FIT	(Produced by HFLAV)				
5.44±0.21±0.53	7.9k	RICHICHI	99	CLEO	$E^{ee}_{\text{cm}} = 10.6$ GeV

$\Gamma(K^- h^+ \pi^- \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ Γ_{92}/Γ

$\Gamma_{92}/\Gamma = (\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{152}+0.892\Gamma_{179})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID
8.6±1.2 OUR FIT	(Produced by HFLAV)

$\Gamma(K^- h^+ \pi^- \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex.}K^0))$ Γ_{92}/Γ_{77}

$\Gamma_{92}/\Gamma_{77} = (\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{152}+0.892\Gamma_{179})/(\Gamma_{78}+0.892\Gamma_{178}+0.0153\Gamma_{180})$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.91±0.26 OUR FIT	(Produced by HFLAV)				
2.61±0.45±0.42	719	RICHICHI	99	CLEO	$E^{ee}_{\text{cm}} = 10.6$ GeV

$\Gamma(K^- \pi^+ \pi^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{93}/Γ

$\Gamma_{93}/\Gamma = (0.34598\Gamma_{38}+0.34598\Gamma_{43}+\Gamma_{97}+\Gamma_{103}+0.2804\Gamma_{152}+0.9078\Gamma_{179})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.477±0.014 OUR FIT	(Produced by HFLAV)				
0.58 $^{+0.15}_{-0.13}$ ±0.12	20	[1] BAUER	94	TPC	$E^{ee}_{\text{cm}} = 29$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.22 $^{+0.16}_{-0.13}$ ±0.05	9	[2] MILLS	85	DLCO	$E^{ee}_{\text{cm}} = 29$ GeV

[1] We multiply 0.58% by 0.20, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

[2] Error correlated with MILLS 85 ($K K \pi \nu$) value. We multiply 0.22% by 0.23, the relative systematic error quoted by MILLS 85, to obtain the systematic error.

$\Gamma(K^-\pi^+\pi^- \geq 0\pi^0\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ — Γ_{94}/Γ

$\Gamma_{94}/\Gamma = (\Gamma_{97}+\Gamma_{103}+0.2302\Gamma_{152}+0.9078\Gamma_{179})/\Gamma$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
0.373±0.013 OUR FIT (Produced by HFLAV)				
0.30 ±0.05 OUR AVERAGE				
• • • We use the following data for averages but not for fits. • • •				
0.343±0.073±0.031	ABBIENDI	00D	OPAL	1990–1995 LEP runs
0.275±0.064	[1] BARATE	98	ALEP	1991–1995 LEP runs

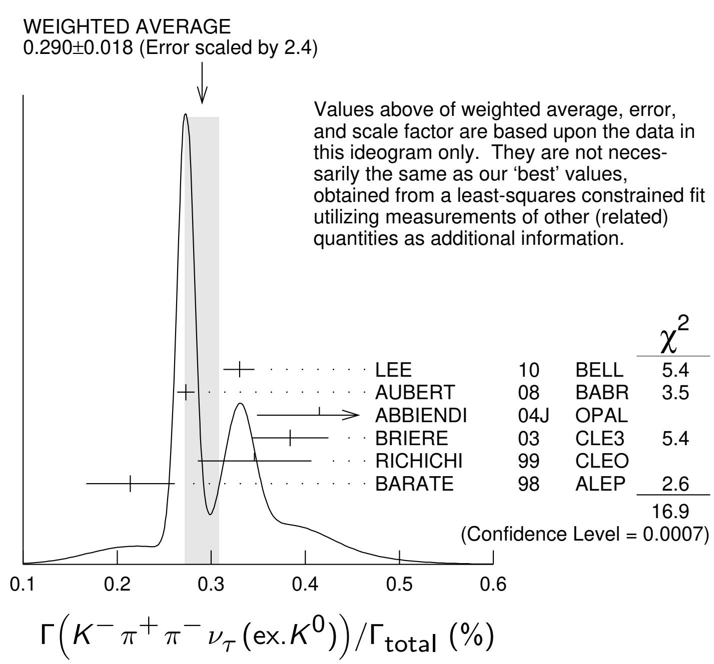
[1] Not independent of BARATE 98 $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ values.

$\Gamma(K^-\pi^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$ — $\Gamma_{95}/\Gamma = (0.34598\Gamma_{38}+\Gamma_{97}+0.0153\Gamma_{179})/\Gamma$

VALUE (%)	DOCUMENT ID
0.345±0.007 OUR FIT (Produced by HFLAV)	

$\Gamma(K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ — $\Gamma_{96}/\Gamma = (\Gamma_{97}+0.0153\Gamma_{179})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.293±0.007 OUR FIT (Produced by HFLAV)					
0.290±0.018 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.					
$0.330\pm0.001^{+0.016}_{-0.017}$	794k	[1] LEE	10	BELL	666 fb^{-1} E^{ee}_{cm}=10.6 GeV
0.273±0.002±0.009	70k	[2] AUBERT	08	BABR	342 fb^{-1} E^{ee}_{cm}=10.6 GeV
0.415±0.053±0.040	269	ABBIENDI	04J	OPAL	1991-1995 LEP runs
0.384±0.014±0.038	3.5k	[3] BRIERE	03	CLE3	E^{ee}_{cm}= 10.6 GeV
0.214±0.037±0.029		BARATE	98	ALEP	1991–1995 LEP runs
• • • We use the following data for averages but not for fits. • • •					
0.346±0.023±0.056	158	[4] RICHICHI	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.360±0.082±0.048		ABBIENDI	00D	OPAL	1990–1995 LEP runs



[1] See footnote to LEE 10 $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ measurement for correlations with other measurements. Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ value.

[2] See footnote to AUBERT 08 $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

[3] 47% correlated with BRIERE 03 $\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau$ and 34% correlated with $\tau^- \rightarrow K^-K^+\pi^-\nu_\tau$ because of a common 5% normalization error.

[4] Not independent of RICHICHI 99 $\Gamma(\tau^- \rightarrow K^-h^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$, $\Gamma(\tau^- \rightarrow K^-K^+\pi^-\nu_\tau)/\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^-h^-h^+\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ values.

$\Gamma(K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma(\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ — Γ_{96}/Γ_{68}

$\Gamma_{96}/\Gamma_{68} = (\Gamma_{97}+0.0153\Gamma_{179})/(\Gamma_{70}+0.0153\Gamma_{178})$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
3.25±0.07 OUR FIT (Produced by HFLAV)					
• • • We use the following data for averages but not for fits. • • •					
$3.92\pm0.02^{+0.15}_{-0.16}$	794k	[1] LEE	10	BELL	666 fb^{-1} $E^{ee}_{\text{cm}} = 10.6$ GeV

[1] Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ values.

$\Gamma(K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0,\omega))/\Gamma_{\text{total}}$ — Γ_{97}/Γ

VALUE (units 10^{-3})	DOCUMENT ID
2.93±0.07 OUR FIT (Produced by HFLAV)	

$\Gamma(K^-\rho^0\nu_\tau \rightarrow K^-\pi^+\pi^-\nu_\tau)/\Gamma(K^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ — Γ_{98}/Γ_{96}

VALUE	DOCUMENT ID		TECN	COMMENT
0.48±0.14±0.10	[1] ASNER	00B	CLEO	$E^{ee}_{\text{cm}} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.39±0.14	[2] BARATE	99R	ALEP	1991–1995 LEP runs

[1] ASNER 00B assume $\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau$ (ex. K^0) decays proceed only through $K\rho$ and $K^*\pi$ intermediate states. They assume the resonance structure of $\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau$ (ex. K^0) decays is dominated by $K_1(1270)^-$ and $K_1(1400)^-$ resonances, and assume $B(K_1(1270) \rightarrow K^*(892)\pi) = (16 \pm 5)\%$, $B(K_1(1270) \rightarrow K\rho) = (42 \pm 6)\%$, and $B(K_1(1400) \rightarrow K\rho) = 0$.

[2] BARATE 99R assume $\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau$ (ex. K^0) decays proceed only through $K\rho$ and $K^*\pi$ intermediate states. The quoted error is statistical only.

$\Gamma(K^-\pi^+\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ — Γ_{99}/Γ

$\Gamma_{99}/\Gamma = (0.34598\Gamma_{43}+\Gamma_{103}+0.2302\Gamma_{152}+0.892\Gamma_{179})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID
13.1±1.2 OUR FIT (Produced by HFLAV)	

$\Gamma(K^-\pi^+\pi^-\pi^0\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ — Γ_{100}/Γ

$\Gamma_{100}/\Gamma = (\Gamma_{103}+0.2302\Gamma_{152}+0.892\Gamma_{179})/\Gamma$

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
7.9±1.2 OUR FIT (Produced by HFLAV)					
7.3±1.2 OUR AVERAGE					
7.4±0.8±1.1		[1] ARMS	05	CLE3	7.6 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
6.1±3.9±1.8		BARATE	98	ALEP	1991–1995 LEP runs
• • • We use the following data for averages but not for fits. • • •					
7.5±2.6±1.8		[2] RICHICHI	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<17	95	ABBIENDI	00D	OPAL	1990–1995 LEP runs

[1] Not independent of ARMS 05 $\Gamma(\tau^- \to K^-\pi^+\pi^-\pi^0\nu_\tau(\text{ex.}K^0,\omega))$ / Γ_{total} and $\Gamma(\tau^- \to K^-\omega\nu_\tau)$ / Γ_{total} values.

[2] Not independent of RICHICHI 99 $\Gamma(\tau^- \to K^-h^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma(\tau^- \to \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$, $\Gamma(\tau^- \to K^-K^+\pi^-\nu_\tau)/\Gamma(\tau^- \to \pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ and BALEST 95C $\Gamma(\tau^- \to h^-h^-h^+\nu_\tau(\text{ex.}K^0))/\Gamma_{\text{total}}$ values.

$\Gamma(K^-\pi^+\pi^-\pi^0\nu_\tau(\text{ex.}K^0,\eta))/\Gamma_{\text{total}}$ — $\Gamma_{101}/\Gamma = (\Gamma_{103}+0.892\Gamma_{179})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID
7.6±1.2 OUR FIT (Produced by HFLAV)	

$\Gamma(K^-\pi^+\pi^-\pi^0\nu_\tau(\text{ex.}K^0,\omega))/\Gamma_{\text{total}}$ — Γ_{102}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.7±0.5±0.8	833	ARMS	05	CLE3	7.6 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(K^-\pi^+\pi^-\pi^0\nu_\tau(\text{ex.}K^0,\omega,\eta))/\Gamma_{\text{total}}$ — Γ_{103}/Γ

VALUE (units 10^{-4})	DOCUMENT ID
3.9±1.4 OUR FIT (Produced by HFLAV)	

$\Gamma(K^-\pi^+K^- \geq 0\text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{104}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
<0.09	95	BAUER	94	TPC	E^{ee}_{cm}= 29 GeV

$\Gamma(K^-K^+\pi^- \geq 0\text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ — $\Gamma_{105}/\Gamma = (\Gamma_{106}+\Gamma_{107})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.1496±0.0033 OUR FIT (Produced by HFLAV)					
0.203 ±0.031 OUR AVERAGE					
0.159 ±0.053 ±0.020		ABBIENDI	00D	OPAL	1990–1995 LEP runs
0.15 $^{+0.09}_{-0.07}$ ±0.03	4	[1] BAUER	94	TPC	E^{ee}_{cm}= 29 GeV
• • • We use the following data for averages but not for fits. • • •					
0.238 ±0.042		[2] BARATE	98	ALEP	1991–1995 LEP runs

[1] We multiply 0.15% by 0.20, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

[2] Not independent of BARATE 98 $\Gamma(\tau^- \to K^-K^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\tau^- \to K^-K^+\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ values.

$\Gamma(K^- K^+ \pi^- \nu_\tau)/\Gamma_{total}$ Γ_{106}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.435±0.027 OUR FIT (Produced by HFLAV)				
1.43 ±0.07 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.				
$1.55 \pm 0.01 {}^{+0.06}_{-0.05}$	108k	[1] LEE 10	BELL	666 fb^{-1} E^{ee}_{cm}=10.6 GeV
$1.346 \pm 0.010 \pm 0.036$	18k	[2] AUBERT 08	BABR	342 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$1.55 \pm 0.06 \pm 0.09$	932	[3] BRIERE 03	CLE3	E^{ee}_{cm}= 10.6 GeV
$1.63 \pm 0.21 \pm 0.17$		BARATE 98	ALEP	1991–1995 LEP runs
• • • We use the following data for averages but not for fits. • • •				
$0.87 \pm 0.56 \pm 0.40$		ABBIENDI 00D	OPAL	1990–1995 LEP runs
$1.45 \pm 0.13 \pm 0.28$	2.3k	[4] RICHICHI 99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.2 {}^{+1.7}_{-1.1} \pm 0.5$	9	[5] MILLS 85	DLCO	E^{ee}_{cm}= 29 GeV

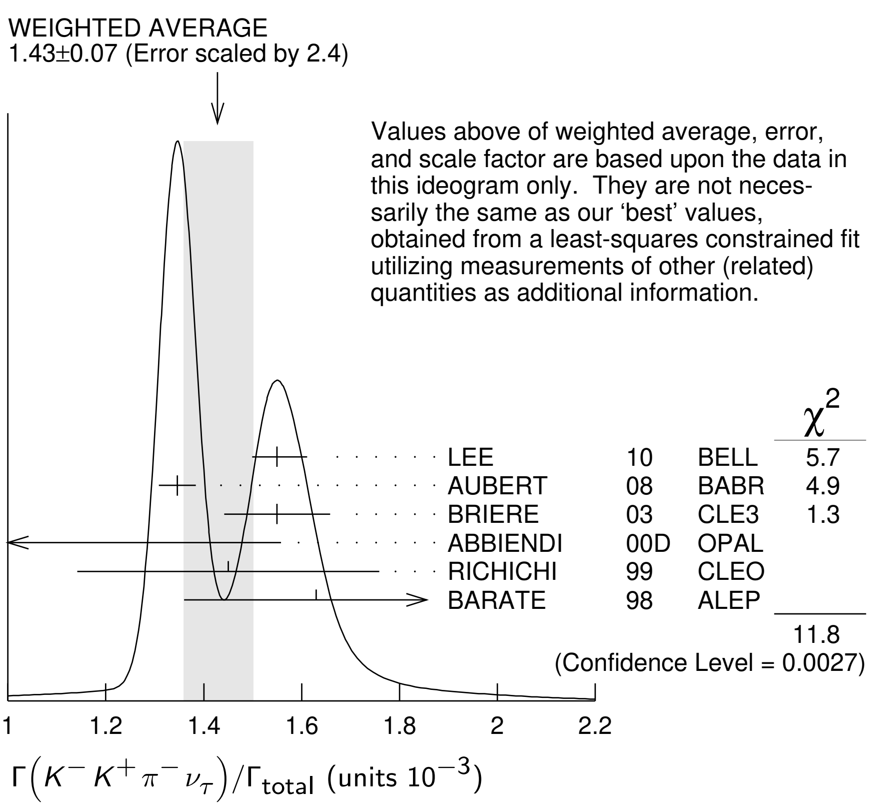
[1] See footnote to LEE 10 $\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ measurement for correlations with other measurements. Not independent of LEE 10 $\Gamma(\tau^- \to K^- K^+ \pi^- \nu_\tau)/\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ value.

[2] See footnote to AUBERT 08 $\Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ measurement for correlations with other measurements.

[3] 71% correlated with BRIERE 03 $\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau$ and 34% correlated with $\tau \to K^- \pi^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

[4] Not independent of RICHICHI 99 $\Gamma(\tau^- \to K^- K^+ \pi^- \nu_\tau)/ \Gamma(\tau^- \to \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ and BALEST 95C $\Gamma(\tau^- \to h^- h^- h^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ values.

[5] Error correlated with MILLS 85 ($K\pi\pi\pi^0\nu$) value. We multiply 0.22% by 0.23, the relative systematic error quoted by MILLS 85, to obtain the systematic error.



$\Gamma(K^- K^+ \pi^- \nu_\tau)/\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ — Γ_{106}/Γ_{68}

$\Gamma_{106}/\Gamma_{68} = \Gamma_{106}/(\Gamma_{70}+0.0153\Gamma_{178})$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.592±0.030 OUR FIT (Produced by HFLAV)					
1.83 ±0.05 OUR AVERAGE					
1.60 ±0.15 ±0.30	2.3k	RICHICHI	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We use the following data for averages but not for fits. • • •					
1.84 ±0.01 ±0.05	108k	[1] LEE	10	BELL	666 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma_{total}$ and $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ values.

$\Gamma(K^- K^+ \pi^- \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{107}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.61±0.18 OUR FIT (Produced by HFLAV)						
0.60±0.18 OUR AVERAGE						
0.55±0.14±0.12		48	ARMS	05	CLE3	7.6 fb^{-1},E^{ee}_{cm}=10.6 GeV
7.5 ±2.9 ±1.5			BARATE	98	ALEP	1991–1995 LEP runs
• • • We use the following data for averages but not for fits. • • •						
3.3 ±1.8 ±0.7		158	[1] RICHICHI	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<27	95		ABBIENDI	00D	OPAL	1990–1995 LEP runs

[1] Not independent of RICHICHI 99 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ values.

$\Gamma(K^- K^+ \pi^- \pi^0 \nu_\tau)/\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex.}K^0))$ — Γ_{107}/Γ_{77}

$\Gamma_{107}/\Gamma_{77} = \Gamma_{107}/(\Gamma_{78}+0.892\Gamma_{178}+0.0153\Gamma_{180})$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.14±0.04 OUR FIT (Produced by HFLAV)					
0.79±0.44±0.16	158	[1] RICHICHI	99	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] RICHICHI 99 also quote a 95%CL upper limit of 0.0157 for this measurement.

$\Gamma(K^- K^+ K^- \nu_\tau)/\Gamma_{total}$ — $\Gamma_{108}/\Gamma = 0.491\Gamma_{170}/\Gamma$

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
2.2 ±0.8 OUR FIT Error includes scale factor of 5.4. (Produced by HFLAV)						
2.1 ±0.8 OUR AVERAGE Error includes scale factor of 5.4.						
3.29±0.17$^{+0.19}_{-0.20}$		3.2k	[1] LEE	10	BELL	666 fb^{-1} E^{ee}_{cm} = 10.6 GeV
1.58±0.13±0.12		275	[2] AUBERT	08	BABR	342 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 3.7	90		BRIERE	03	CLE3	E^{ee}_{cm}= 10.6 GeV
< 19	90		BARATE	98	ALEP	1991–1995 LEP runs

[1] See footnote to LEE 10 $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ measurement for correlations with other measurements. Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ K^- \nu_\tau)/\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ value.

[2] See footnote to AUBERT 08 $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ measurement for correlations with other measurements.

$\Gamma(K^- K^+ K^- \nu_\tau)/\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))$ — Γ_{108}/Γ_{68}

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$3.90 \pm 0.02 ^{+0.22}_{-0.23}$	3.2k	[1] LEE	10	BELL	666 fb^{-1} $E^{ee}_{\text{cm}} = 10.6$ GeV

[1] Not independent of LEE 10 $\Gamma(\tau^- \rightarrow K^- K^+ K^- \nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ values.

$\Gamma(K^- K^+ K^- \nu_\tau (\text{ex. } \phi))/\Gamma_{\text{total}}$ — Γ_{109}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.5 × 10^{-6}	90	AUBERT	08	BABR	342 fb^{-1} $E^{ee}_{\text{cm}} = 10.6$ GeV

$\Gamma(K^- K^+ K^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{110}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.8 × 10^{-6}	90	ARMS	05	CLE3	7.6 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(\pi^- K^+ \pi^- \geq 0 \text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{111}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
<0.25	95	BAUER	94	TPC	E^{ee}_{cm}= 29 GeV

$\Gamma(e^- e^- e^+ \overline{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{112}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
2.8±1.4±0.4	5	ALAM	96	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- e^- e^+ \overline{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{113}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<3.2	90	ALAM	96	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\pi^- e^- e^+ \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{114}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
seen	400	[1] JIN	19	BELL	562 fb^{-1}, $E^{ee}_{\text{cm}} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.46±0.13±0.21	400	[1] JIN	19	BELL	axial-vector, 562 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
3.01±0.27±0.43	400	[1] JIN	19	BELL	vector, 562 fb^{-1}, E^{ee}_{cm} = 10.6 GeV

[1] JIN 19 measures B($\tau^- \rightarrow \pi^- e^- e^+ \nu_\tau$($m_{\pi^- e^- e^+} > 1.05\text{GeV/c}^2$)) = (5.90 ± 0.53 ± 0.86) × 10^{-6}, which is only sensitive to the structure-dependent contribution, and assumes that the decay proceeds with either a pure axial-vector current or a pure vector current to obtain the two respective branching fraction measurements for this mode, which are 100% correlated.

$\Gamma(\pi^- \mu^- \mu^+ \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{115}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.14 × 10^{-5}	90	JIN	19	BELL	562 fb^{-1}, $E^{ee}_{\text{cm}} = 10.6$ GeV

$\Gamma(3h^- 2h^+ \geq 0\text{ neutrals }\nu_\tau (\text{ex. } K^0_S \to \pi^- \pi^+)(\text{"5-prong"}))/\Gamma_{\text{total}}$ Γ_{116}/Γ

$\Gamma_{116}/\Gamma = (\Gamma_{117}+\Gamma_{123})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.099±0.004 OUR FIT	(Produced by HFLAV)			
0.107±0.007 OUR AVERAGE	Error includes scale factor of 1.1.			
0.170±0.022±0.026		[1] ACHARD 01D	L3	1992–1995 LEP runs
0.097±0.005±0.011	419	GIBAUT 94B	CLEO	E^{ee}_{cm}= 10.6 GeV
0.102±0.029	13	BYLSMA 87	HRS	E^{ee}_{cm}= 29 GeV
• • • We use the following data for averages but not for fits. • • •				
0.093±0.009±0.012		SCHAEL 05C	ALEP	1991-1995 LEP runs
0.115±0.013±0.006	112	[2] ABREU 01M	DLPH	1992–1995 LEP runs
0.119±0.013±0.008	119	[3] ACKERSTAFF 99E	OPAL	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.26 ±0.06 ±0.05		ACTON 92H	OPAL	E^{ee}_{cm}= 88.2–94.2 GeV
0.10 $^{+0.05}_{-0.04}$ ±0.03		DECAMP 92C	ALEP	1989–1990 LEP runs
0.16 ±0.13 ±0.04		BEHREND 89B	CELL	E^{ee}_{cm}= 14–47 GeV
0.3 ±0.1 ±0.2		BARTEL 85F	JADE	E^{ee}_{cm}= 34.6 GeV
0.13 ±0.04	10	BELTRAMI 85	HRS	Repl. by BYLSMA 87
0.16 ±0.08 ±0.04	4	BURCHAT 85	MRK2	E^{ee}_{cm}= 29 GeV
1.0 ±0.4	10	BEHREND 82	CELL	Repl. by BEHREND 89B

[1] The correlation coefficients between this measurement and the ACHARD 01D measurements of B($\tau \to$ "1-prong") and B($\tau \to$ "3-prong") are −0.082 and −0.19 respectively.

[2] The correlation coefficients between this measurement and the ABREU 01M measurements of B($\tau \to$ 1-prong) and B($\tau \to$ 3-prong) are −0.08 and −0.08 respectively.

[3] Not independent of ACKERSTAFF 99E B($\tau^- \to 3h^- 2h^+ \nu_\tau$(ex. K^0)) and B($\tau^- \to 3h^- 2h^+ \pi^0 \nu_\tau$(ex. K^0)) measurements.

$\Gamma(3h^- 2h^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{\text{total}}$ $\Gamma_{117}/\Gamma = (\Gamma_{118}+\Gamma_{120}+0.0153\Gamma_{185})/\Gamma$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
8.29±0.31 OUR FIT	(Produced by HFLAV)			
8.32±0.35 OUR AVERAGE				
9.7 ±1.5 ±0.5	96	[1] ABDALLAH 06A	DLPH	1992–1995 LEP runs
7.2 ±0.9 ±1.2	165	[2] SCHAEL 05C	ALEP	1991-1995 LEP runs
9.1 ±1.4 ±0.6	97	ACKERSTAFF 99E	OPAL	1991–1995 LEP runs
7.7 ±0.5 ±0.9	295	GIBAUT 94B	CLEO	E^{ee}_{cm}= 10.6 GeV
6.4 ±2.3 ±1.0	12	ALBRECHT 88B	ARG	E^{ee}_{cm}= 10 GeV
5.1 ±2.0	7	BYLSMA 87	HRS	E^{ee}_{cm}= 29 GeV
• • • We use the following data for averages but not for fits. • • •				
8.56±0.05±0.42	34k	AUBERT,B 05W	BABR	232 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
8.0 ±1.1 ±1.3	58	BUSKULIC 96	ALEP	Repl. by SCHAEL 05C
6.7 ±3.0	5	[3] BELTRAMI 85	HRS	Repl. by BYLSMA 87

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

[2] See footnote to SCHAEL 05C $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

[3] The error quoted is statistical only.

$\Gamma(3\pi^- 2\pi^+ \nu_\tau (\text{ex.}K^0, \omega))/\Gamma_{total}$ — $\Gamma_{118}/\Gamma = (\Gamma_{119}+\Gamma_{173})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
8.27±0.31 OUR FIT	(Produced by HFLAV)			
• • • We use the following data for averages but not for fits. • • •				
8.33±0.04±0.43	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] Not independent of LEES 12X $\Gamma(\tau^- \to f_1(1285)\pi^-\nu_\tau \to 3\pi^- 2\pi^+ \nu_\tau)/\Gamma$ and $\Gamma(\tau^- \to 3\pi^- 2\pi^+ \nu_\tau (\text{ex.}K^0, \omega, f_1(1285)))/\Gamma$ values.

$\Gamma(3\pi^- 2\pi^+ \nu_\tau (\text{ex.}K^0, \omega, f_1(1285)))/\Gamma_{total}$ — Γ_{119}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.75±0.30 OUR FIT	(Produced by HFLAV)				
7.68±0.04±0.40	69k	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(K^- 2\pi^- 2\pi^+ \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{120}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
0.6±1.2 OUR FIT	(Produced by HFLAV)			
0.6±0.5±1.1	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] LEES 12X meaurement corresponds to the lower limit of $< 2.4 \times 10^{-6}$ at 90% CL.

$\Gamma(K^+ 3\pi^- \pi^+ \nu_\tau)/\Gamma_{total}$ — Γ_{121}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.0 \times 10^{-6}$	90	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(K^+ K^- 2\pi^- \pi^+ \nu_\tau)/\Gamma_{total}$ — Γ_{122}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.5 \times 10^{-7}$	90	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(3h^- 2h^+ \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — $\Gamma_{123}/\Gamma = (\Gamma_{124}+\Gamma_{127})/\Gamma$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.65±0.11 OUR FIT	(Produced by HFLAV)				
1.74±0.27 OUR AVERAGE					
1.6 ±1.2 ±0.6	13	[1] ABDALLAH	06A	DLPH	1992–1995 LEP runs
2.1 ±0.7 ±0.9	95	[2] SCHAEL	05C	ALEP	1991-1995 LEP runs
1.7 ±0.2 ±0.2	231	ANASTASSOV	01	CLEO	E^{ee}_{cm}= 10.6 GeV
2.7 ±1.8 ±0.9	23	ACKERSTAFF	99E	OPAL	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.8 ±0.7 ±1.2	18	BUSKULIC	96	ALEP	Repl. by SCHAEL 05C
1.9 ±0.4 ±0.4	31	GIBAUT	94B	CLEO	Repl. by ANASTASSOV 01
5.1 ±2.2	6	BYLSMA	87	HRS	E^{ee}_{cm}= 29 GeV
6.7 ±3.0	5	[3] BELTRAMI	85	HRS	Repl. by BYLSMA 87

[1] See footnote to ABDALLAH 06A $\Gamma(\tau^- \to h^- \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

[2] SCHAEL 05C quote $(1.4 \pm 0.7 \pm 0.9) \times 10^{-4}$. We add 0.7×10^{-4} to remove their correction for $\tau^- \to \eta\pi^-\pi^+\pi^-\nu_\tau \to 3\pi^- 2\pi^+ \pi^0 \nu_\tau$ and $\tau^- \to K^*(892)^- \eta \nu_\tau \to 3\pi^- 2\pi^+ \pi^0 \nu_\tau$ decays. See footnote to SCHAEL 05C $\Gamma(\tau^- \to e^- \overline{\nu}_e \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

[3] The error quoted is statistical only.

$\Gamma(3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{124}/Γ

$\Gamma_{124}/\Gamma = (\Gamma_{126}+0.2302\Gamma_{160}+0.892\Gamma_{185})/\Gamma$

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.64±0.11 OUR FIT (Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •				
1.65±0.05±0.09	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] Not independent of LEES 12X measurements of $\Gamma(\tau^- \to 2\pi^- \pi^+ \omega \nu_\tau (\text{ex.}K^0))/\Gamma$, $\Gamma(\tau^- \to \eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))/\Gamma$, and $\Gamma(\tau^- \to 3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex.}K^0, \eta, \omega, f_1(1285)))/\Gamma$.

$\Gamma(3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex.}K^0, \eta, f_1(1285)))/\Gamma_{total}$ — Γ_{125}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.11±0.04±0.09	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] Not independent of LEES 12X $\Gamma(\tau^- \to 2\pi^- \pi^+ \omega \nu_\tau (\text{ex.}K^0))/\Gamma$ and $\Gamma(\tau^- \to 3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex.}K^0, \eta, \omega, f_1(1285)))/\Gamma$ values.

$\Gamma(3\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex.}K^0, \eta, \omega, f_1(1285)))/\Gamma_{total}$ — Γ_{126}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.38±0.09 OUR FIT (Produced by HFLAV)					
0.36±0.03±0.09	7.3k	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(K^- 2\pi^- 2\pi^+ \pi^0 \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{127}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
1.1±0.6 OUR FIT (Produced by HFLAV)				
1.1±0.4±0.4	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] LEES 12X meaurement corresponds to the lower limit of $< 1.9 \times 10^{-6}$ at 90% CL.

$\Gamma(K^+ 3\pi^- \pi^+ \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{128}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8 × 10^{-7}	90	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(3h^- 2h^+ 2\pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{129}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.4 × 10^{-6}	90	AUBERT,B	06	BABR	232 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1 \times 10^{-4}$	90	GIBAUT	94B	CLEO	E^{ee}_{cm} = 10.6 GeV

$\Gamma((5\pi)^- \nu_\tau)/\Gamma_{total}$ — Γ_{130}/Γ

$\Gamma_{130}/\Gamma = (\Gamma_{30}+\frac{1}{2}\Gamma_{45}+\Gamma_{48}+\frac{1}{2}\Gamma_{61}+\Gamma_{85}+\Gamma_{117}+0.5559\Gamma_{150}+0.892\Gamma_{180})/\Gamma$

VALUE (%)	DOCUMENT ID	TECN	COMMENT
0.78±0.05 OUR FIT (Produced by HFLAV)			

• • • We use the following data for averages but not for fits. • • •

0.61±0.06±0.08	[1] GIBAUT	94B	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Not independent of GIBAUT 94B B($3h^- 2h^+ \nu_\tau$), PROCARIO 93 B($h^- 4\pi^0 \nu_\tau$), and BORTOLETTO 93 B($2h^- h^+ 2\pi^0 \nu_\tau$)/B("3prong") measurements. Result is corrected for η contributions.

$\Gamma(4h^- 3h^+ \geq 0\text{ neutrals } \nu_\tau (\text{"7-prong"}))/\Gamma_{\text{total}}$ — Γ_{131}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.0 × 10⁻⁷	90	AUBERT,B	05F	BABR	232 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.8 \times 10^{-5}$	95	ACKERSTAFF	97J	OPAL	1990–1995 LEP runs
$<2.4 \times 10^{-6}$	90	EDWARDS	97B	CLEO	E^{ee}_{cm}= 10.6 GeV
$<2.9 \times 10^{-4}$	90	BYLSMA	87	HRS	E^{ee}_{cm}= 29 GeV

$\Gamma(4h^- 3h^+ \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{132}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.3 \times 10^{-7}$	90	AUBERT,B	05F	BABR	232 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(4h^- 3h^+ \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{133}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.5 \times 10^{-7}$	90	AUBERT,B	05F	BABR	232 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(X^-(S{=}-1)\nu_\tau)/\Gamma_{\text{total}}$ — Γ_{134}/Γ

$\Gamma_{134}/\Gamma = (\Gamma_{10}+\Gamma_{16}+\Gamma_{23}+\Gamma_{28}+\Gamma_{36}+\Gamma_{41}+\Gamma_{45}+\Gamma_{61}+\Gamma_{97}+\Gamma_{103}+\Gamma_{120}+\Gamma_{127}+\Gamma_{152}+\Gamma_{154}+\Gamma_{156}+0.8312\Gamma_{170}+\Gamma_{179})/\Gamma$

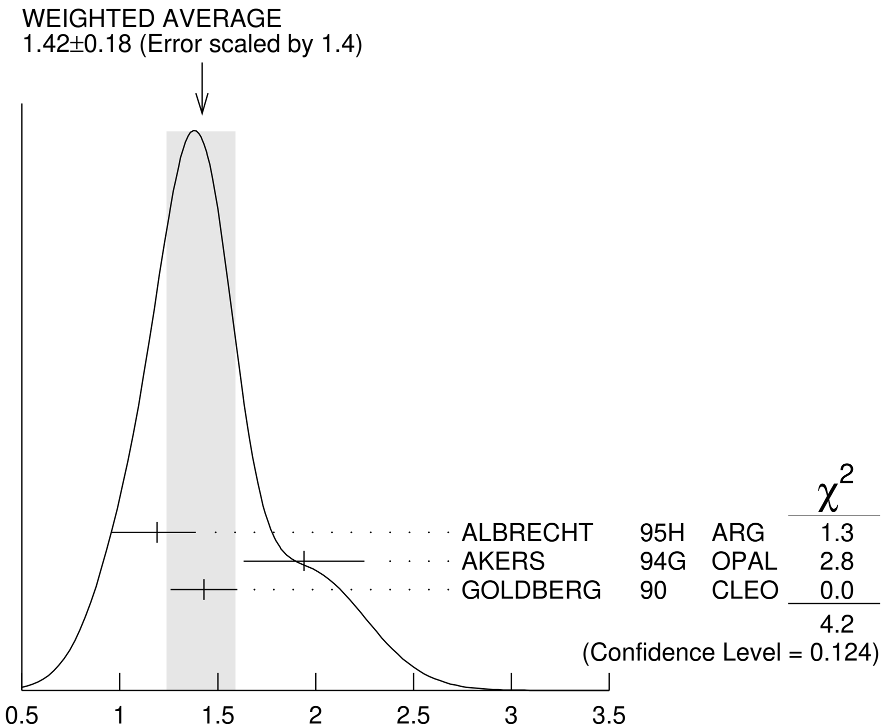
VALUE (%)	DOCUMENT ID		TECN	COMMENT
2.92±0.04 OUR FIT (Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •				
2.87±0.12	[1] BARATE	99R	ALEP	1991–1995 LEP runs

[1] BARATE 99R perform a combined analysis of all ALEPH LEP 1 data on τ branching fraction measurements for decay modes having total strangeness equal to -1.

$\Gamma(K^*(892)^- \geq 0\text{ neutrals } \geq 0K^0_L \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{135}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.42±0.18 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.				
$1.19 \pm 0.15^{+0.13}_{-0.18}$	104	ALBRECHT	95H	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
1.94±0.27±0.15	74	[1] AKERS	94G	OPAL	E^{ee}_{cm}= 88–94 GeV
1.43±0.11±0.13	475	[2] GOLDBERG	90	CLEO	E^{ee}_{cm}= 9.4–10.9 GeV

[1] AKERS 94G reject events in which a K^0_S accompanies the $K^*(892)^-$. We do not correct for them.
[2] GOLDBERG 90 estimates that 10% of observed $K^*(892)$ are accompanied by a π^0.



$\Gamma\left(K^*(892)^-\nu_\tau\right)/\Gamma_{\text{total}}$ $\qquad \Gamma_{136}/\Gamma$

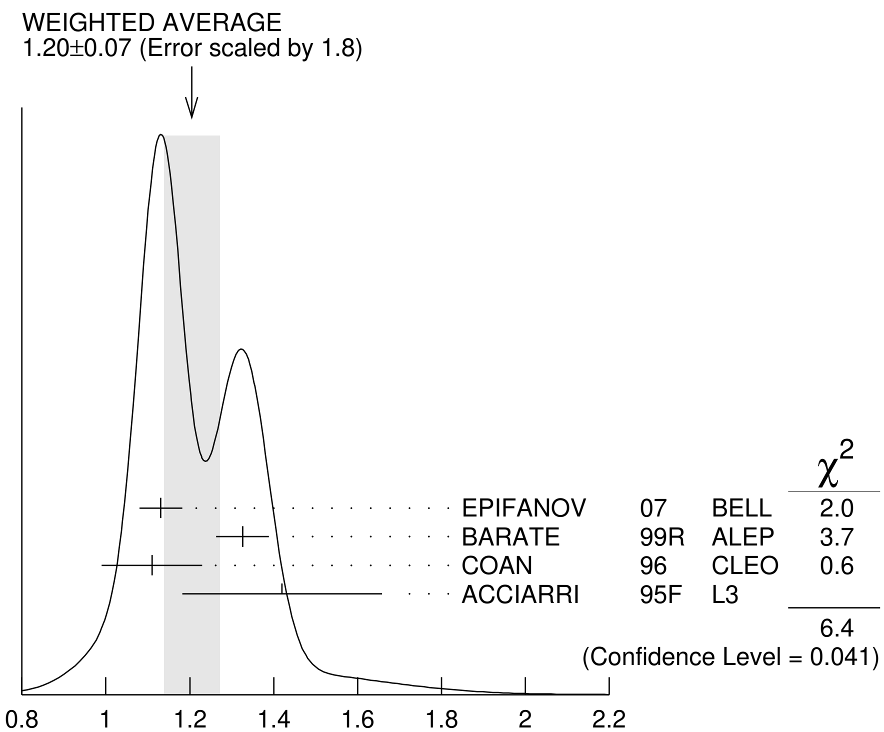
VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.20 ±0.07 OUR AVERAGE		Error includes scale factor of 1.8. See the ideogram below.			
1.131±0.006±0.051	49k	[1] EPIFANOV	07	BELL	351 fb^{-1} E^{ee}_{cm}=10.6 GeV
1.326±0.063		BARATE	99R	ALEP	1991–1995 LEP runs
1.11 ±0.12		[2] COAN	96	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV
1.42 ±0.22 ±0.09		[3] ACCIARRI	95F	L3	1991–1993 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.39 ±0.09 ±0.10		[4] BUSKULIC	96	ALEP	Repl. by BARATE 99R
1.45 ±0.13 ±0.11	273	[5] BUSKULIC	94F	ALEP	Repl. by BUSKULIC 96
1.23 ±0.21 $^{+0.11}_{-0.21}$	54	[6] ALBRECHT	88L	ARG	E^{ee}_{cm}= 10 GeV
1.9 ±0.3 ±0.4	44	[7] TSCHIRHART	88	HRS	E^{ee}_{cm}= 29 GeV
1.5 ±0.4 ±0.4	15	[8] AIHARA	87C	TPC	E^{ee}_{cm}= 29 GeV
1.3 ±0.3 ±0.3	31	YELTON	86	MRK2	E^{ee}_{cm}= 29 GeV
1.7 ±0.7	11	DORFAN	81	MRK2	E^{ee}_{cm}= 4.2–6.7 GeV

[1] EPIFANOV 07 quote B($\tau^- \rightarrow K^*(892)^-\nu_\tau$) B($K^*(892)^- \rightarrow K^0_S\pi^-$) = (3.77 ± 0.02(stat) ±0.12(syst) ±0.12(mod)) × 10^{-3}. We add the systematic and model uncertainties in quadrature and divide by B($K^*(892)^- \rightarrow K^0_S\pi^-$) = 0.3333.

[2] Not independent of COAN 96 B($\pi^-\overline{K}^0\nu_\tau$) and BATTLE 94 B($K^-\pi^0\nu_\tau$) measurements. $K\pi$ final states are consistent with and assumed to originate from $K^*(892)^-$ production.

[3] This result is obtained from their B($\pi^-\overline{K}^0\nu_\tau$) assuming all those decays originate in $K^*(892)^-$ decays.

[4] Not independent of BUSKULIC 96 B($\pi^- \overline{K}^0 \nu_\tau$) and B($K^- \pi^0 \nu_\tau$) measurements.
[5] BUSKULIC 94F obtain this result from BUSKULIC 94F B($\overline{K}^0 \pi^- \nu_\tau$) and BUSKULIC 94E B($K^- \pi^0 \nu_\tau$) assuming all of those decays originate in $K^*(892)^-$ decays.
[6] The authors divide by $\Gamma_2/\Gamma = 0.865$ to obtain this result.
[7] Not independent of TSCHIRHART 88 $\Gamma(\tau^- \to h^- \overline{K}^0 \geq 0$ neutrals $\geq 0 K^0_L \nu_\tau)$ / Γ.
[8] Decay π^- identified in this experiment, is assumed in the others.



$\Gamma\left(K^*(892)^- \nu_\tau\right)/\Gamma_{total}$ (%)

$\Gamma\left(K^*(892)^- \nu_\tau\right)/\Gamma\left(\pi^- \pi^0 \nu_\tau\right)$ Γ_{136}/Γ_{14}

VALUE	DOCUMENT ID		TECN	COMMENT
0.075±0.027	[1] ABREU	94K	DLPH	LEP 1992 Z data

[1] ABREU 94K quote B($\tau^- \to K^*(892)^- \nu_\tau$)B($K^*(892)^- \to K^- \pi^0$)/B($\tau^- \to \rho^- \nu_\tau$) $= 0.025 \pm 0.009$. We divide by B($K^*(892)^- \to K^- \pi^0$) $= 0.333$ to obtain this result.

$\Gamma\left(K^*(892)^- \nu_\tau \to \pi^- \overline{K}^0 \nu_\tau\right)/\Gamma\left(\pi^- \overline{K}^0 \nu_\tau\right)$ Γ_{137}/Γ_{36}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.933±0.027	49k	EPIFANOV	07	BELL	351 fb^{-1} E^{ee}_{cm}= 10.6 GeV

$\Gamma\left(K^*(892)^0 K^- \geq 0 \text{ neutrals } \nu_\tau\right)/\Gamma_{total}$ Γ_{138}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.32±0.08±0.12	119	GOLDBERG	90	CLEO	E^{ee}_{cm}= 9.4–10.9 GeV

$\Gamma(K^*(892)^0 K^- \nu_\tau)/\Gamma_{total}$ — Γ_{139}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.21 ±0.04 OUR AVERAGE					
0.213±0.048		[1] BARATE	98	ALEP	1991–1995 LEP runs
0.20 ±0.05 ±0.04	47	ALBRECHT	95H	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

[1] BARATE 98 measure the K^- ($\rho^0 \rightarrow \pi^+\pi^-$) fraction in $\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau$ decays to be (35 ± 11)% and derive this result from their measurement of $\Gamma(\tau^- \rightarrow K^-\pi^+\pi^-\nu_\tau)/\Gamma_{total}$ assuming the intermediate states are all $K^-\rho$ and $K^- K^*(892)^0$.

$\Gamma(\overline{K}^*(892)^0 \pi^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{total}$ — Γ_{140}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.38±0.11±0.13	105	GOLDBERG	90	CLEO	E^{ee}_{cm}= 9.4–10.9 GeV

$\Gamma(\overline{K}^*(892)^0 \pi^- \nu_\tau)/\Gamma_{total}$ — Γ_{141}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.22 ±0.05 OUR AVERAGE					
0.209±0.058		[1] BARATE	98	ALEP	1991–1995 LEP runs
0.25 ±0.10 ±0.05	27	ALBRECHT	95H	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

[1] BARATE 98 measure the $K^- K^*(892)^0$ fraction in $\tau^- \rightarrow K^- K^+\pi^-\nu_\tau$ decays to be (87 ± 13)% and derive this result from their measurement of $\Gamma(\tau^- \rightarrow K^- K^+\pi^-\nu_\tau)/\Gamma_{total}$.

$\Gamma((\overline{K}^*(892)\pi)^- \nu_\tau \rightarrow \pi^-\overline{K}^0\pi^0\nu_\tau)/\Gamma_{total}$ — Γ_{142}/Γ

VALUE (%)	DOCUMENT ID		TECN	COMMENT
0.10 ±0.04 OUR AVERAGE				
0.097±0.044±0.036	[1] BARATE	99K	ALEP	1991–1995 LEP runs
0.106±0.037±0.032	[2] BARATE	98E	ALEP	1991–1995 LEP runs

[1] BARATE 99K measure K^0's by detecting K^0_L's in their hadron calorimeter. They determine the $\overline{K}^0\rho^-$ fraction in $\tau^- \rightarrow \pi^-\overline{K}^0\pi^0\nu_\tau$ decays to be (0.72 ± 0.12 ± 0.10) and multiply their B($\pi^-\overline{K}^0\pi^0\nu_\tau$) measurement by one minus this fraction to obtain the quoted result.

[2] BARATE 98E reconstruct K^0's using $K^0_S \rightarrow \pi^+\pi^-$ decays. They determine the $\overline{K}^0\rho^-$ fraction in $\tau^- \rightarrow \pi^-\overline{K}^0\pi^0\nu_\tau$ decays to be (0.64 ± 0.09 ± 0.10) and multiply their B($\pi^-\overline{K}^0\pi^0\nu_\tau$) measurement by one minus this fraction to obtain the quoted result.

$\Gamma(K_1(1270)^- \nu_\tau)/\Gamma_{total}$ — Γ_{143}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.47±0.11 OUR AVERAGE					
0.48±0.11		BARATE	99R	ALEP	1991–1995 LEP runs
$0.41^{+0.41}_{-0.35}$±0.10	5	[1] BAUER	94	TPC	E^{ee}_{cm}= 29 GeV

[1] We multiply 0.41% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$\Gamma(K_1(1400)^- \nu_\tau)/\Gamma_{total}$ — Γ_{144}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.17±0.26 OUR AVERAGE	Error includes scale factor of 1.7.				
0.05±0.17		BARATE	99R	ALEP	1991–1995 LEP runs
$0.76^{+0.40}_{-0.33}\pm0.20$	11	[1] BAUER	94	TPC	E^{ee}_{cm}= 29 GeV

[1] We multiply 0.76% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$[\Gamma(K_1(1270)^- \nu_\tau)+\Gamma(K_1(1400)^- \nu_\tau)]/\Gamma_{total}$ — $(\Gamma_{143}+\Gamma_{144})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.17^{+0.41}_{-0.37}\pm0.29}$	16	[1] BAUER	94	TPC	E^{ee}_{cm}= 29 GeV

[1] We multiply 1.17% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error. Not independent of BAUER 94 B($K_1(1270)^- \nu_\tau$) and BAUER 94 B($K_1(1400)^- \nu_\tau$) measurements.

$\Gamma(K_1(1270)^- \nu_\tau)/[\Gamma(K_1(1270)^- \nu_\tau)+\Gamma(K_1(1400)^- \nu_\tau)]$ — $\Gamma_{143}/(\Gamma_{143}+\Gamma_{144})$

VALUE	DOCUMENT ID		TECN	COMMENT
0.69±0.15 OUR AVERAGE				
0.71±0.16±0.11	[1] ABBIENDI	00D	OPAL	1990–1995 LEP runs
0.66±0.19±0.13	[2] ASNER	00B	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] ABBIENDI 00D assume the resonance structure of $\tau^- \to K^-\pi^+\pi^-\nu_\tau$ decays is dominated by the $K_1(1270)^-$ and $K_1(1400)^-$ resonances.

[2] ASNER 00B assume the resonance structure of $\tau^- \to K^-\pi^+\pi^-\nu_\tau$ (ex. K^0) decays is dominated by $K_1(1270)^-$ and $K_1(1400)^-$ resonances.

$\Gamma(K^*(1410)^- \nu_\tau)/\Gamma_{total}$ — Γ_{145}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.5^{+1.4}_{-1.0}}$	BARATE	99R	ALEP	1991–1995 LEP runs

$\Gamma(K^*_0(1430)^- \nu_\tau)/\Gamma_{total}$ — Γ_{146}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<0.5	95	BARATE	99R	ALEP	1991–1995 LEP runs

$\Gamma(K^*_2(1430)^- \nu_\tau)/\Gamma_{total}$ — Γ_{147}/Γ

VALUE (%)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.3	95		TSCHIRHART	88	HRS	E^{ee}_{cm}= 29 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.33	95		[1] ACCIARRI	95F	L3	1991–1993 LEP runs
<0.9	95	0	DORFAN	81	MRK2	E^{ee}_{cm}= 4.2–6.7 GeV

[1] ACCIARRI 95F quote B($\tau^- \to K^*(1430)^- \to \pi^-\overline{K}^0\nu_\tau$) < 0.11%. We divide by B($K^*(1430)^- \to \pi^-\overline{K}^0$) = 0.33 to obtain the limit shown.

$\Gamma(a_0(980)^- \geq 0\text{ neutrals } \nu_\tau)/\Gamma_{total} \times B(a_0(980) \to K^0 K^-)$ — $\Gamma_{148}/\Gamma \times B$

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<2.8	90	GOLDBERG	90	CLEO	E^{ee}_{cm}= 9.4–10.9 GeV

$\Gamma(\eta\pi^-\nu_\tau)/\Gamma_{total}$ Γ_{149}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
< 0.99	95		[1] DEL-AMO-SA..	11E	BABR	470 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 6.2	95		BUSKULIC	97C	ALEP	1991–1994 LEP runs
< 1.4	95	0	BARTELT	96	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
< 3.4	95		ARTUSO	92	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
< 90	95		ALBRECHT	88M	ARG	$E^{ee}_{cm} \approx$ 10 GeV
<140	90		BEHREND	88	CELL	E^{ee}_{cm}= 14–46.8 GeV
<180	95		BARINGER	87	CLEO	E^{ee}_{cm}= 10.5 GeV
<250	90	0	COFFMAN	87	MRK3	E^{ee}_{cm}= 3.77 GeV
510 ±100±120		65	DERRICK	87	HRS	E^{ee}_{cm}= 29 GeV
<100	95		GAN	87B	MRK2	E^{ee}_{cm}= 29 GeV

[1] DEL-AMO-SANCHEZ 11E also quote B($\tau^- \rightarrow \eta\pi^-\nu_\tau$) = $(3.4 \pm 3.4 \pm 2.1) \times 10^{-5}$.

$\Gamma(\eta\pi^-\pi^0\nu_\tau)/\Gamma_{total}$ Γ_{150}/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.39± 0.07 OUR FIT (Produced by HFLAV)						
1.38± 0.09 OUR AVERAGE Error includes scale factor of 1.2.						
1.35± 0.03± 0.07		6.0k	INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV
1.8 ± 0.4 ± 0.2			BUSKULIC	97C	ALEP	1991–1994 LEP runs
1.7 ± 0.2 ± 0.2		125	ARTUSO	92	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 11.0	95		ALBRECHT	88M	ARG	$E^{ee}_{cm} \approx$ 10 GeV
< 21.0	95		BARINGER	87	CLEO	E^{ee}_{cm}= 10.5 GeV
42.0 $^{+7.0}_{-12.0}$ ±16.0			[1] GAN	87	MRK2	E^{ee}_{cm}= 29 GeV

[1] Highly correlated with GAN 87 $\Gamma(\pi^- 3\pi^0 \nu_\tau)/\Gamma$(total) value.

$\Gamma(\eta\pi^-\pi^0\pi^0\nu_\tau)/\Gamma_{total}$ Γ_{151}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.9 ±0.4 OUR FIT (Produced by HFLAV)						
1.81±0.31 OUR AVERAGE						
2.01±0.34±0.22		381	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We use the following data for averages but not for fits. • • •						
1.5 ±0.5		30	[1] ANASTASSOV	01	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.4 ±0.6 ±0.3		15	[2] BERGFELD	97	CLEO	Repl. by ANASTASSOV 01
< 4.3	95		ARTUSO	92	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
<120	95		ALBRECHT	88M	ARG	$E^{ee}_{cm} \approx$ 10 GeV

[1] Weighted average of BERGFELD 97 and ANASTASSOV 01 value of $(1.5 \pm 0.6 \pm 0.3) \times 10^{-4}$ obtained using η's reconstructed from $\eta \rightarrow \pi^+\pi^-\pi^0$ decays.
[2] BERGFELD 97 reconstruct η's using $\eta \rightarrow \gamma\gamma$ decays.

$\Gamma(\eta K^- \nu_\tau)/\Gamma_{total}$ — Γ_{152}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.55±0.08 OUR FIT (Produced by HFLAV)						
1.54±0.08 OUR AVERAGE						
1.42±0.11±0.07		690	DEL-AMO-SA...	11E	BABR	470 fb^{-1} E^{ee}_{cm}= 10.6 GeV
1.58±0.05±0.09		1.6k	INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV
2.9 $^{+1.3}_{-1.2}$ ±0.7			BUSKULIC	97C	ALEP	1991–1994 LEP runs
2.6 ±0.5 ±0.5		85	BARTELT	96	CLEO	E^{ee}_{cm} ≈ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 4.7	95		ARTUSO	92	CLEO	E^{ee}_{cm} ≈ 10.6 GeV

$\Gamma(\eta K^*(892)^- \nu_\tau)/\Gamma_{total}$ — Γ_{153}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.38±0.15 OUR AVERAGE					
1.34±0.12±0.09	245	[1] INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV
2.90±0.80±0.42	25	BISHAI	99	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Not independent of INAMI 09 B($\tau^- \rightarrow \eta K^- \pi^0 \nu_\tau$) and B($\tau^- \rightarrow \eta \overline{K}^0 \pi^- \nu_\tau$) values.

$\Gamma(\eta K^- \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{154}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.48±0.12 OUR FIT (Produced by HFLAV)					
0.48±0.12 OUR AVERAGE					
0.46±0.11±0.04	270	INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV
1.77±0.56±0.71	36	BISHAI	99	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\eta K^- \pi^0 (\text{non-}K^*(892)) \nu_\tau)/\Gamma_{total}$ — Γ_{155}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.5 × 10^{-5}	90	INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV

$\Gamma(\eta \overline{K}^0 \pi^- \nu_\tau)/\Gamma_{total}$ — Γ_{156}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.94±0.15 OUR FIT (Produced by HFLAV)					
0.93±0.15 OUR AVERAGE					
0.88±0.14±0.06	161	[1] INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV
2.20±0.70±0.22	15	[2] BISHAI	99	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] We multiply the INAMI 09 measurement B($\tau^- \rightarrow \eta K^0_S \pi^- \nu_\tau$) = (0.44 ± 0.07 ± 0.03) × 10^{-4} by 2 to obtain the listed value.

[2] We multiply the BISHAI 99 measurement B($\tau^- \rightarrow \eta K^0_S \pi^- \nu_\tau$) = (1.10 ± 0.35 ± 0.11) × 10^{-4} by 2 to obtain the listed value.

$\Gamma(\eta \overline{K}^0 \pi^- \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{157}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.0 × 10^{-5}	90	[1] INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] We multiply the INAMI 09 measurement B($\tau^- \rightarrow \eta K^0_S \pi^- \pi^0 \nu_\tau$) < 2.5 × 10^{-5} by 2 to obtain the listed value.

$\Gamma(\eta K^- K^0 \nu_\tau)/\Gamma_{total}$ — Γ_{158}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<9.0 × 10^{-6}	90	[1] INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV

[1] We multiply the INAMI 09 measurement B($\tau^- \to \eta K^- K^0_S \nu_\tau$) $<$ 4.5×10^{-6} by 2 to obtain the listed value.

$\Gamma(\eta \pi^+ \pi^- \pi^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{total}$ — Γ_{159}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
<0.3	90	ABACHI	87B	HRS	E^{ee}_{cm}= 29 GeV

$\Gamma(\eta \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{160}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
2.20±0.13 OUR FIT (Produced by HFLAV)					
2.23±0.12 OUR AVERAGE					
2.10±0.09±0.13	2.9k	[1] LEES	12X	BABR	$\eta \to \gamma\gamma$
2.37±0.12±0.18	1.4k	[1] LEES	12X	BABR	$\eta \to \pi^+\pi^-\pi^0$
2.54±0.27±0.25	315	[1] LEES	12X	BABR	$\eta \to 3\pi^0$
• • • We use the following data for averages but not for fits. • • •					
2.3 ±0.5	170	[2] ANASTASSOV	01	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.60±0.05±0.11	1.8 k	AUBERT	08AE	BABR	Repl. by LEES 12X
3.4 $^{+0.6}_{-0.5}$ ±0.6	89	[3] BERGFELD	97	CLEO	Repl. by ANASTASSOV 01

[1] LEES 12X uses 468 fb^{-1} of data taken at E^{ee}_{cm} = 10.6 GeV. It gives the average of the three measurements listed here as (2.25 ± 0.07 ± 0.12) × 10^{-4}.

[2] Weighted average of BERGFELD 97 and ANASTASSOV 01 measurements using η's reconstructed from $\eta \to \pi^+\pi^-\pi^0$ and $\eta \to 3\pi^0$ decays.

[3] BERGFELD 97 reconstruct η's using $\eta \to \gamma\gamma$ and $\eta \to 3\pi^0$ decays.

$\Gamma(\eta \pi^- \pi^+ \pi^- \nu_\tau (\text{ex.}K^0, f_1(1285)))/\Gamma_{total}$ — Γ_{161}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
0.99±0.09±0.13	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] LEES 12X obtain this result by subtracting their B($\tau^- \to f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau$) measurement from their B($\tau^- \to \eta\pi^-\pi^+\pi^-\nu_\tau$(ex.$K^0$)) measurement.

$\Gamma(\eta a_1(1260)^- \nu_\tau \to \eta \pi^- \rho^0 \nu_\tau)/\Gamma_{total}$ — Γ_{162}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.9 × 10^{-4}	90	BERGFELD	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\eta \eta \pi^- \nu_\tau)/\Gamma_{total}$ — Γ_{163}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.4 × 10^{-6}	90	INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.1 × 10^{-4}	95	ARTUSO	92	CLEO	E^{ee}_{cm} ≈ 10.6 GeV
<8.3 × 10^{-3}	95	ALBRECHT	88M	ARG	E^{ee}_{cm} ≈ 10 GeV

$\Gamma(\eta\eta\pi^-\pi^0\nu_\tau)/\Gamma_{total}$ — Γ_{164}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
< 2.0	95	ARTUSO	92	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<90	95	ALBRECHT	88M	ARG	$E^{ee}_{cm} \approx$ 10 GeV

$\Gamma(\eta\eta K^-\nu_\tau)/\Gamma_{total}$ — Γ_{165}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.0 \times 10^{-6}$	90	INAMI	09	BELL	490 fb^{-1} E^{ee}_{cm}= 10.6 GeV

$\Gamma(\eta'(958)\pi^-\nu_\tau)/\Gamma_{total}$ — Γ_{166}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.0 \times 10^{-6}$	90	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<7.2 \times 10^{-6}$	90	AUBERT	08AE	BABR	384 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<7.4 \times 10^{-5}$	90	BERGFELD	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\eta'(958)\pi^-\pi^0\nu_\tau)/\Gamma_{total}$ — Γ_{167}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-5}$	90	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8.0 \times 10^{-5}$	90	BERGFELD	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\eta'(958)K^-\nu_\tau)/\Gamma_{total}$ — Γ_{168}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.4 \times 10^{-6}$	90	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(\phi\pi^-\nu_\tau)/\Gamma_{total}$ — Γ_{169}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
3.42±0.55±0.25		344	AUBERT	08	BABR	342 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 20	90		[1] AVERY	97	CLEO	E^{ee}_{cm}= 10.6 GeV
< 35	90		ALBRECHT	95H	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

[1] AVERY 97 limit varies from (1.2–2.0) $\times 10^{-4}$ depending on decay model assumptions.

$\Gamma(\phi K^-\nu_\tau)/\Gamma_{total}$ — Γ_{170}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
4.4 ±1.6 OUR FIT (Produced by HFLAV)						
3.70±0.33 OUR AVERAGE Error includes scale factor of 1.3.						
• • • We use the following data for averages but not for fits. • • •						
3.39±0.20±0.28		274	AUBERT	08	BABR	342 fb^{-1} E^{ee}_{cm} = 10.6 GeV
4.05±0.25±0.26		551	INAMI	06	BELL	401 fb^{-1} E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<6.7	90		[1] AVERY	97	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] AVERY 97 limit varies from (5.4–6.7) $\times 10^{-5}$ depending on decay model assumptions.

$\Gamma(f_1(1285)\pi^-\nu_\tau)/\Gamma_{total}$ Γ_{171}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.9 ±0.5 OUR AVERAGE	Error includes scale factor of 1.9.				
4.73±0.28±0.45	3.7k	[1] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV
3.60±0.18±0.23	2.5k	[2] LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3.19±0.18±1.00	1.3 k	[3] AUBERT	08AE	BABR	Repl. by LEES 12X
3.9 ±0.7 ±0.5	1.4 k	[4] AUBERT,B	05W	BABR	Repl. by LEES 12X
5.8 $^{+1.4}_{-1.3}$ ±1.8	54	[5] BERGFELD	97	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] LEES 12X obtain this value by dividing their B($\tau^- \to f_1(1285)\pi^-\nu_\tau \to 3\pi^-2\pi^+\nu_\tau$) measurement by the PDG 12 value of B($f_1(1285) \to 2\pi^+2\pi^-$) = $0.111^{+0.007}_{-0.006}$.

[2] LEES 12X obtain this value by dividing their B($\tau^- \to f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau$) measurement by 2/3 of the PDG 12 value of B($f_1(1285) \to \eta\pi\pi$) = $0.524^{+0.019}_{-0.021}$.

[3] AUBERT 08AE obtain this value by dividing their B($\tau^- \to f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau$) measurement by the PDG 06 value of B($f_1(1285) \to \eta\pi^-\pi^+$) = 0.35 ± 0.11. The quote $(3.19 \pm 0.18 \pm 0.16 \pm 0.99) \times 10^{-4}$ where the final error is due to the uncertainty on B($f_1(1285) \to \eta\pi^-\pi^+$). We combine the two systematic errors in quadrature.

[4] AUBERT,B 05W use the $f_1(1285) \to 2\pi^+2\pi^-$ decay mode and the PDG 04 value of B($f_1(1285) \to 2\pi^+2\pi^-$) = $0.110^{+0.007}_{-0.006}$.

[5] BERGFELD 97 use the $f_1(1285) \to \eta\pi^+\pi^-$ decay mode.

$\Gamma(f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau)/\Gamma_{total}$ Γ_{172}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.18±0.07 OUR AVERAGE	Error includes scale factor of 1.3.				
1.26±0.06±0.06	2.5k	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV
1.11±0.06±0.05	1.3 k	AUBERT	08AE	BABR	384 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau)/\Gamma(\eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0))$ $\Gamma_{172}/\Gamma_{160}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.69±0.01±0.05	[1] AUBERT	08AE	BABR	384 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.55±0.14	BERGFELD	97	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Not independent of AUBERT 08AE B($\tau^- \to f_1(1285)\pi^-\nu_\tau \to \eta\pi^-\pi^+\pi^-\nu_\tau$) and B($\tau^- \to \eta\pi^-\pi^+\pi^-\nu_\tau(\text{ex.}K^0)$) values.

$\Gamma(f_1(1285)\pi^-\nu_\tau \to 3\pi^-2\pi^+\nu_\tau)/\Gamma_{total}$ Γ_{173}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.52 ±0.04 OUR FIT	(Produced by HFLAV)				
0.520±0.031±0.037	3.7k	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm}=10.6 GeV

$\Gamma(\pi(1300)^-\nu_\tau \to (\rho\pi)^-\nu_\tau \to (3\pi)^-\nu_\tau)/\Gamma_{total}$ Γ_{174}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.0 × 10^{-4}	90	ASNER	00	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\pi(1300)^- \nu_\tau \to ((\pi\pi)_{S-\text{wave}}\pi)^- \nu_\tau \to (3\pi)^- \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{175}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.9 × 10^{-4}	90	ASNER	00	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(h^- \omega \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{176}/Γ

$\Gamma_{176}/\Gamma = (\Gamma_{178}+\Gamma_{179}+\Gamma_{180})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
2.40±0.08 OUR FIT	(Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •					
1.65±0.3 ±0.2	1513	ALBRECHT	88M	ARG	$E^{ee}_{\text{cm}} \approx$ 10 GeV

$\Gamma(h^- \omega \nu_\tau)/\Gamma_{\text{total}}$ — $\Gamma_{177}/\Gamma = (\Gamma_{178}+\Gamma_{179})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
1.99±0.06 OUR FIT	(Produced by HFLAV)				
1.92±0.07 OUR AVERAGE					
1.91±0.07±0.06	5803	BUSKULIC	97C	ALEP	1991–1994 LEP runs
1.60±0.27±0.41	139	BARINGER	87	CLEO	E^{ee}_{cm}= 10.5 GeV
• • • We use the following data for averages but not for fits. • • •					
1.95±0.07±0.11	2223	[1] BALEST	95C	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV

[1] Not independent of BALEST 95C B($\tau^- \to h^- \omega \nu_\tau$)/B($\tau^- \to h^- h^- h^+ \pi^0 \nu_\tau$) value.

$[\Gamma(\pi^- \omega \nu_\tau) + \Gamma(K^- \omega \nu_\tau)]/\Gamma(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex.} K^0))$ — $(\Gamma_{178}+\Gamma_{179})/\Gamma_{74}$

$(\Gamma_{178}+\Gamma_{179})/\Gamma_{74} = (\Gamma_{178}+\Gamma_{179})/(\Gamma_{78}+\Gamma_{103}+\Gamma_{107}+0.2302\Gamma_{152}+0.892\Gamma_{178}+0.892\Gamma_{179}+0.0153\Gamma_{180})$

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
43.5±1.4 OUR FIT	(Produced by HFLAV)				
45.3±1.9 OUR AVERAGE					
43.1±3.3	2350	[1] BUSKULIC	96	ALEP	LEP 1991–1993 data
46.4±1.6±1.7	2223	[2] BALEST	95C	CLEO	$E^{ee}_{\text{cm}} \approx$ 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
37 ±5 ±2	458	[3] ALBRECHT	91D	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

[1] BUSKULIC 96 quote the fraction of $\tau \to h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0) decays which originate in a $h^- \omega$ final state = 0.383 ± 0.029. We divide this by the $\omega(782) \to \pi^+ \pi^- \pi^0$ branching fraction (0.888).

[2] BALEST 95C quote the fraction of $\tau^- \to h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0) decays which originate in a $h^- \omega$ final state equals 0.412 ± 0.014 ± 0.015. We divide this by the $\omega(782) \to \pi^+ \pi^- \pi^0$ branching fraction (0.888).

[3] ALBRECHT 91D quote the fraction of $\tau^- \to h^- h^- h^+ \pi^0 \nu_\tau$ decays which originate in a $\pi^- \omega$ final state equals 0.33 ± 0.04 ± 0.02. We divide this by the $\omega(782) \to \pi^+ \pi^- \pi^0$ branching fraction (0.888).

$\Gamma(\pi^- \omega \nu_\tau)/\Gamma_{\text{total}}$ — Γ_{178}/Γ

VALUE (%)	DOCUMENT ID
1.95±0.06 OUR FIT	(Produced by HFLAV)

$\Gamma(K^- \omega \nu_\tau)/\Gamma_{total}$ — Γ_{179}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
4.1±0.9 OUR FIT	(Produced by HFLAV)				
4.1±0.6±0.7	500	ARMS	05	CLE3	7.6 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(h^- \omega \pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{180}/Γ

VALUE (%)	EVTS	DOCUMENT ID		TECN	COMMENT
0.41±0.04 OUR FIT	(Produced by HFLAV)				
0.43±0.06±0.05	7283	BUSKULIC	97C	ALEP	1991–1994 LEP runs

$\Gamma(h^- \omega \pi^0 \nu_\tau)/\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals } \geq 0 K^0_L \nu_\tau)$ — Γ_{180}/Γ_{62}

$\Gamma_{180}/\Gamma_{62} = \Gamma_{180}/(0.34598\Gamma_{36}+0.34598\Gamma_{38}+0.34598\Gamma_{41}+0.34598\Gamma_{43}+0.4247\Gamma_{48}+0.6920\Gamma_{49}+0.8494\Gamma_{52}+0.6920\Gamma_{56}+0.6534\Gamma_{61}+\Gamma_{70}+\Gamma_{78}+\Gamma_{85}+\Gamma_{89}+\Gamma_{97}+\Gamma_{103}+\Gamma_{106}+\Gamma_{107}+0.2804\Gamma_{150}+0.2302\Gamma_{151}+0.2804\Gamma_{152}+0.2804\Gamma_{154}+0.3759\Gamma_{156}+0.3257\Gamma_{160}+0.7259\Gamma_{170}+0.9078\Gamma_{178}+0.9078\Gamma_{179}+0.9078\Gamma_{180}+0.892\Gamma_{182})$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
(2.69 ±0.28) × 10^{-2} OUR FIT	(Produced by HFLAV)				
• • • We use the following data for averages but not for fits. • • •					
0.028±0.003±0.003	430	[1] BORTOLETTO	93	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV

[1] Not independent of BORTOLETTO 93 $\Gamma(\tau^- \to h^- \omega \pi^0 \nu_\tau)/\Gamma(\tau^- \to h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex.}K^0))$ value.

$\Gamma(h^- \omega \pi^0 \nu_\tau)/\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex.}K^0))$ — Γ_{180}/Γ_{84}

$\Gamma_{180}/\Gamma_{84} = \Gamma_{180}/(\Gamma_{85}+0.2302\Gamma_{150}+0.2302\Gamma_{154}+0.892\Gamma_{180})$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
82±8 OUR FIT	(Produced by HFLAV)			
81±6±6	BORTOLETTO	93	CLEO	$E^{ee}_{cm} \approx$ 10.6 GeV

$\Gamma(h^- \omega 2\pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{181}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.4 ±0.4 ±0.3	53	ANASTASSOV	01	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.89^{+0.74}_{-0.67}\pm0.40$	19	ANDERSON	97	CLEO	Repl. by ANASTASSOV 01

$\Gamma(\pi^- \omega 2\pi^0 \nu_\tau)/\Gamma_{total}$ — Γ_{182}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.72±0.16 OUR FIT	(Produced by HFLAV)				
0.73±0.12±0.12	1.1k	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(h^- 2\omega \nu_\tau)/\Gamma_{total}$ — Γ_{183}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.4 × 10^{-7}	90	AUBERT,B	06	BABR	232 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(2h^- h^+ \omega \nu_\tau)/\Gamma_{total}$ — Γ_{184}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.2±0.2±0.1	110	ANASTASSOV 01	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(2\pi^- \pi^+ \omega \nu_\tau (\text{ex.}K^0))/\Gamma_{total}$ — Γ_{185}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
0.84±0.06 OUR FIT	(Produced by HFLAV)				
0.84±0.04±0.06	2.4k	LEES	12X	BABR	468 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(e^- \gamma)/\Gamma_{total}$ — Γ_{186}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.3 × 10^{-8}	90	AUBERT	10B	BABR	516 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.6 \times 10^{-8}$	90	UNO	21	BELL	988 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$<1.2 \times 10^{-7}$	90	HAYASAKA	08	BELL	535 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$<1.1 \times 10^{-7}$	90	AUBERT	06C	BABR	232 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$<3.9 \times 10^{-7}$	90	HAYASAKA	05	BELL	86.7 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$<2.7 \times 10^{-6}$	90	EDWARDS	97	CLEO	
$<1.1 \times 10^{-4}$	90	ABREU	95U	DLPH	1990–1993 LEP runs
$<1.2 \times 10^{-4}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<2.0 \times 10^{-4}$	90	KEH	88	CBAL	E^{ee}_{cm}= 10 GeV
$<6.4 \times 10^{-4}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

$\Gamma(e^- \gamma\gamma)/\Gamma_{total}$ — Γ_{187}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.5 × 10^{-4}	90	[1] BRYMAN	21	RVUE	516 fb^{-1}, E^{ee}_{cm} = 10.6 GeV

[1] BRYMAN 21 reinterprets the upper limit result on B($\tau^- \to e^- \gamma$) and B($\tau^- \to \mu^- \gamma$) by AUBERT 10B, estimating with a simulation the efficiency for this decay mode to be detected as the corresponding AUBERT 10B decay mode.

$\Gamma(\mu^- \gamma)/\Gamma_{total}$ — Γ_{188}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 4.2 × 10^{-8}	90	UNO	21	BELL	988 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 4.4 \times 10^{-8}$	90	AUBERT	10B	BABR	516 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$< 4.5 \times 10^{-8}$	90	HAYASAKA	08	BELL	535 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$< 6.8 \times 10^{-8}$	90	AUBERT,B	05A	BABR	232 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$< 3.1 \times 10^{-7}$	90	ABE	04B	BELL	86.3 fb^{-1}, E^{ee}_{cm} = 10.6 GeV
$< 1.1 \times 10^{-6}$	90	AHMED	00	CLEO	E^{ee}_{cm}= 10.6 GeV

$<3.0 \times 10^{-6}$	90	EDWARDS	97	CLEO	
$<6.2 \times 10^{-5}$	90	ABREU	95U	DLPH	1990–1993 LEP runs
$<0.42 \times 10^{-5}$	90	BEAN	93	CLEO	E^{ee}_{cm}= 10.6 GeV
$<3.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<55 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

$\Gamma(\mu^- \gamma\gamma)/\Gamma_{total}$ — Γ_{189}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.8 \times 10^{-4}$	90	[1] BRYMAN	21	RVUE	516 fb^{-1}, E^{ee}_{cm} = 10.6 GeV

[1] BRYMAN 21 reinterprets the upper limit result on B($\tau^- \to e^- \gamma$) and B($\tau^- \to \mu^- \gamma$) by AUBERT 10B, estimating with a simulation the efficiency for this decay mode to be detected as the corresponding AUBERT 10B decay mode.

$\Gamma(e^- \pi^0)/\Gamma_{total}$ — Γ_{190}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.0 \times 10^{-8}$	90	MIYAZAKI	07	BELL	401 fb^{-1}, E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.3 \times 10^{-7}$	90	AUBERT	07I	BABR	339 fb^{-1}, E^{ee}_{cm}=10.6 GeV
$<1.9 \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<3.7 \times 10^{-6}$	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV
$<17 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<14 \times 10^{-5}$	90	KEH	88	CBAL	E^{ee}_{cm}= 10 GeV
$<210 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

$\Gamma(\mu^- \pi^0)/\Gamma_{total}$ — Γ_{191}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-7}$	90	AUBERT	07I	BABR	339 fb^{-1}, E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.2 \times 10^{-7}$	90	MIYAZAKI	07	BELL	401 fb^{-1}, E^{ee}_{cm}=10.6 GeV
$<4.1 \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<4.0 \times 10^{-6}$	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV
$<4.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<82 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

$\Gamma(e^- K^0_S)/\Gamma_{total}$ — Γ_{192}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.6 \times 10^{-8}$	90	MIYAZAKI	10A	BELL	671 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.3 \times 10^{-8}$	90	AUBERT	09D	BABR	469 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<5.6 \times 10^{-8}$	90	MIYAZAKI	06A	BELL	281 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<9.1 \times 10^{-7}$	90	CHEN	02C	CLEO	E^{ee}_{cm}= 10.6 GeV
$<1.3 \times 10^{-3}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

$\Gamma(\mu^- K^0_S)/\Gamma_{total}$ — Γ_{193}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.3 × 10^{-8}	90	MIYAZAKI	10A	BELL	671 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.0 × 10^{-8}	90	AUBERT	09D	BABR	469 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<4.9 × 10^{-8}	90	MIYAZAKI	06A	BELL	281 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<9.5 × 10^{-7}	90	CHEN	02C	CLEO	E^{ee}_{cm}= 10.6 GeV
<1.0 × 10^{-3}	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

$\Gamma(e^- \eta)/\Gamma_{total}$ — Γ_{194}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 9.2 × 10^{-8}	90	MIYAZAKI	07	BELL	401 fb^{-1}, E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 1.6 × 10^{-7}	90	AUBERT	07I	BABR	339 fb^{-1}, E^{ee}_{cm}=10.6 GeV
< 2.4 × 10^{-7}	90	ENARI	05	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
< 8.2 × 10^{-6}	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV
< 6.3 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
<24 × 10^{-5}	90	KEH	88	CBAL	E^{ee}_{cm}= 10 GeV

$\Gamma(\mu^- \eta)/\Gamma_{total}$ — Γ_{195}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.5 × 10^{-8}	90	MIYAZAKI	07	BELL	401 fb^{-1}, E^{ee}_{cm}=10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.5 × 10^{-7}	90	AUBERT	07I	BABR	339 fb^{-1}, E^{ee}_{cm}=10.6 GeV
<1.5 × 10^{-7}	90	ENARI	05	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
<3.4 × 10^{-7}	90	ENARI	04	BELL	84.3 fb^{-1}, E^{ee}_{cm}=10.6 GeV
<9.6 × 10^{-6}	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV
<7.3 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV

$\Gamma(e^- \rho^0)/\Gamma_{total}$ — Γ_{196}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 2.2 × 10^{-8}	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 1.8 × 10^{-8}	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 4.6 × 10^{-8}	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 6.3 × 10^{-8}	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 6.5 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 2.0 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
< 4.2 × 10^{-6}	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98
< 1.9 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
<37 × 10^{-5}	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

[1] Supersedes MIYAZAKI 11.
[2] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \rho^0)/\Gamma_{total}$ — Γ_{197}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 1.7 × 10^−8	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 1.2 × 10^−8	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 2.6 × 10^−8	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 6.8 × 10^−8	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 2.0 × 10^−7	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
< 6.3 × 10^−6	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
< 5.7 × 10^−6	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98
< 2.9 × 10^−5	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
<44 × 10^−5	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

[1] Supersedes MIYAZAKI 11.
[2] BARTELT 94 assume phase space decays.

$\Gamma(e^- \omega)/\Gamma_{total}$ — Γ_{198}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.4 × 10^−8	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.8 × 10^−8	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<1.1 × 10^−7	90	AUBERT	08K	BABR	384 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<1.8 × 10^−7	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] Supersedes MIYAZAKI 11.

$\Gamma(\mu^- \omega)/\Gamma_{total}$ — Γ_{199}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.9 × 10^−8	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.7 × 10^−8	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<1.0 × 10^−7	90	AUBERT	08K	BABR	384 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<8.9 × 10^−8	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV

[1] Supersedes MIYAZAKI 11.

$\Gamma(e^- K^*(892)^0)/\Gamma_{total}$ — Γ_{200}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.9 × 10^−8	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.2 × 10^−8	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<5.9 × 10^−8	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7.8 × 10^−8	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<3.0 × 10^−7	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<5.1 × 10^−6	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<6.3 × 10^−6	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98
<3.8 × 10^−5	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV

[1] Supersedes MIYAZAKI 11.
[2] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- K^*(892)^0)/\Gamma_{total}$ — Γ_{201}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.9 × 10^{-8}	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<7.2 × 10^{-8}	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<1.7 × 10^{-7}	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<5.9 × 10^{-8}	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<3.9 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7.5 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<9.4 × 10^{-6}	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98
<4.5 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV

[1] Supersedes MIYAZAKI 11.
[2] BARTELT 94 assume phase space decays.

$\Gamma(e^- \overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{202}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.7 × 10^{-8}	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.4 × 10^{-8}	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<4.6 × 10^{-8}	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7.7 × 10^{-8}	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<4.0 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7.4 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<1.1 × 10^{-5}	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98

[1] Supersedes MIYAZAKI 11.
[2] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{203}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.3 × 10^{-8}	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<7.0 × 10^{-8}	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7.3 × 10^{-8}	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<1.0 × 10^{-7}	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<4.0 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7.5 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<8.7 × 10^{-6}	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98

[1] Supersedes MIYAZAKI 11.
[2] BARTELT 94 assume phase space decays.

$\Gamma(e^- \eta'(958))/\Gamma_{total}$ — Γ_{204}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 1.6 × 10^{-7}	90	MIYAZAKI	07	BELL	401 fb^{-1}, E^{ee}_{cm}=10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.4 \times 10^{-7}$	90	AUBERT	07I	BABR	339 fb^{-1}, E^{ee}_{cm}=10.6 GeV
$<10. \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- \eta'(958))/\Gamma_{total}$ — Γ_{205}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.3 \times 10^{-7}$	90	MIYAZAKI	07	BELL	401 fb^{-1}, E^{ee}_{cm}=10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1.4 \times 10^{-7}$	90	AUBERT	07I	BABR	339 fb^{-1}, E^{ee}_{cm}=10.6 GeV
$<4.7 \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^- f_0(980) \to e^- \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{206}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.2 \times 10^{-8}$	90	MIYAZAKI	09	BELL	671 fb^{-1} E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- f_0(980) \to \mu^- \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{207}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4 \times 10^{-8}$	90	MIYAZAKI	09	BELL	671 fb^{-1} E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^- \phi)/\Gamma_{total}$ — Γ_{208}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-8}$	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<3.1 \times 10^{-8}$	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<3.1 \times 10^{-8}$	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<7.3 \times 10^{-8}$	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<7.3 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<6.9 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Supersedes MIYAZAKI 11.

$\Gamma(\mu^- \phi)/\Gamma_{total}$ — Γ_{209}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.3 \times 10^{-8}$	90	[1] TSUZUKI	23	BELL	980 fb^{-1} E^{ee}_{cm} = 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<8.4 \times 10^{-8}$	90	MIYAZAKI	11	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.9 \times 10^{-7}$	90	AUBERT	09W	BABR	451 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.3 \times 10^{-7}$	90	NISHIO	08	BELL	543 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<7.7 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<7.0 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV

[1] Supersedes MIYAZAKI 11.

$\Gamma(e^- e^+ e^-)/\Gamma_{total}$ — Γ_{210}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 2.7 \times 10^{-8}$	90	HAYASAKA	10	BELL	782 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 2.9 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 3.6 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 4.3 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 2.0 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 3.5 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 2.9 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$< 0.33 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$< 1.3 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$< 2.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9
$<40 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^- \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{211}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 2.7 \times 10^{-8}$	90	HAYASAKA	10	BELL	782 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 3.2 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 4.1 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 3.7 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 3.3 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 2.0 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 1.8 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$< 0.36 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$< 2.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9
$<33 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^+ \mu^- \mu^-)/\Gamma_{total}$ — Γ_{212}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.7 \times 10^{-8}$	90	HAYASAKA	10	BELL	782 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.6 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<2.3 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<5.6 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<1.3 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<2.0 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1} E^{ee}_{cm}= 10.6 GeV

$<1.5 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<0.35 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<1.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<1.6 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- e^+ e^-)/\Gamma_{total}$ — Γ_{213}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 1.8 \times 10^{-8}$	90	HAYASAKA	10	BELL	782 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 2.2 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 2.7 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 8.0 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 2.7 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 1.9 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 1.7 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$< 0.34 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$< 1.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$< 2.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9
$<44 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^+ e^- e^-)/\Gamma_{total}$ — Γ_{214}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.5 \times 10^{-8}$	90	HAYASAKA	10	BELL	782 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.8 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<2.0 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<5.8 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<1.1 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<2.0 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$<1.5 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<0.34 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<1.4 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<1.6 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \mu^+ \mu^-)/\Gamma_{total}$ — Γ_{215}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 2.1 \times 10^{-8}$	90	HAYASAKA	10	BELL	782 fb^{-1} E^{ee}_{cm}= 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 8.0 \times 10^{-8}$	90	SIRUNYAN	21D	CMS	33.2 fb^{-1}, pp at 13 TeV
$< 3.8 \times 10^{-7}$	90	AAD	16BA	ATLS	20.3 fb^{-1}, pp at 8 TeV
$< 4.6 \times 10^{-8}$	90	AAIJ	15AI	LHCB	3.0 fb^{-1}, pp at 7, 8 TeV
$< 8.0 \times 10^{-8}$	90	[1] AAIJ	13AH	LHCB	1.0 fb^{-1}, pp at 7 TeV
$< 3.3 \times 10^{-8}$	90	LEES	10A	BABR	468 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 3.2 \times 10^{-8}$	90	MIYAZAKI	08	BELL	535 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 5.3 \times 10^{-8}$	90	AUBERT	07BK	BABR	376 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 1.9 \times 10^{-7}$	90	AUBERT	04J	BABR	91.5 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 2.0 \times 10^{-7}$	90	YUSA	04	BELL	87.1 fb^{-1} E^{ee}_{cm}= 10.6 GeV
$< 1.9 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$< 0.43 \times 10^{-5}$	90	[2] BARTELT	94	CLEO	Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$< 1.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9
$<49 \times 10^{-5}$	90	HAYES	82	MRK2	E^{ee}_{cm}= 3.8–6.8 GeV

[1] Repl. by AAIJ 15AI.
[2] BARTELT 94 assume phase space decays.

$\Gamma(e^-\pi^+\pi^-)/\Gamma_{total}$ — Γ_{216}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.3 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.4 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<7.3 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<2.2 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<4.4 \times 10^{-6}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<2.7 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<6.0 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^+\pi^-\pi^-)/\Gamma_{total}$ — Γ_{217}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8.8 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<2.0 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<2.7 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<1.9 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<4.4 \times 10^{-6}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<1.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<1.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \pi^+ \pi^-)/\Gamma_{total}$ Γ_{218}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2.1 × 10^{-8}	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.3 × 10^{-8}	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
<4.8 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<2.9 × 10^{-7}	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
<8.2 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<7.4 × 10^{-6}	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
<3.6 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
<3.9 × 10^{-5}	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^+ \pi^- \pi^-)/\Gamma_{total}$ Γ_{219}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.9 × 10^{-8}	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<3.7 × 10^{-8}	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
<3.4 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<7 × 10^{-8}	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
<3.4 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<6.9 × 10^{-6}	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
<6.3 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
<3.9 × 10^{-5}	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^- \pi^+ K^-)/\Gamma_{total}$ Γ_{220}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.7 × 10^{-8}	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<5.8 × 10^{-8}	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
<7.2 × 10^{-7}	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
<3.2 × 10^{-7}	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
<6.4 × 10^{-6}	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
<7.7 × 10^{-6}	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
<2.9 × 10^{-5}	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
<5.8 × 10^{-5}	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^- \pi^- K^+)/\Gamma_{total}$ Γ_{221}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.1 × 10^{-8}	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<5.2 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<1.6 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.7 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<3.8 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<4.6 \times 10^{-6}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<5.8 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^+ \pi^- K^-)/\Gamma_{total}$ Γ_{222}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.2 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.7 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<1.9 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.8 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<2.1 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<4.5 \times 10^{-6}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<2.0 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<4.9 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(e^- K^0_S K^0_S)/\Gamma_{total}$ Γ_{223}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.1 \times 10^{-8}$	90	MIYAZAKI	10A	BELL	671 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.2 \times 10^{-6}$	90	CHEN	02C	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^- K^+ K^-)/\Gamma_{total}$ Γ_{224}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.4 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.4 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<3.0 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.4 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<6.0 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^+ K^- K^-)/\Gamma_{total}$ Γ_{225}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.3 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<6.0 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<3.1 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<1.5 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<3.8 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- \pi^+ K^-)/\Gamma_{total}$ — Γ_{226}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 8.6 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$< 1.6 \times 10^{-7}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$< 2.7 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$< 2.6 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$< 7.5 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$< 8.7 \times 10^{-6}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<11 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$< 7.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \pi^- K^+)/\Gamma_{total}$ — Γ_{227}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.5 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.0 \times 10^{-7}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<7.3 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<3.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<7.4 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<1.5 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<7.7 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^+ \pi^- K^-)/\Gamma_{total}$ — Γ_{228}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.8 \times 10^{-8}$	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<9.4 \times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<2.9 \times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<2.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<7.0 \times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV
$<2.0 \times 10^{-5}$	90	[1] BARTELT	94	CLEO	Repl. by BLISS 98
$<5.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV
$<4.0 \times 10^{-5}$	90	BOWCOCK	90	CLEO	E^{ee}_{cm}= 10.4–10.9

[1] BARTELT 94 assume phase space decays.

$\Gamma(\mu^- K^0_S K^0_S)/\Gamma_{total}$ — Γ_{229}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.0 \times 10^{-8}$	90	MIYAZAKI	10A	BELL	671 fb^{-1} E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.4 \times 10^{-6}$	90	CHEN	02C	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- K^+ K^-)/\Gamma_{total}$ — Γ_{230}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 4.4 × 10⁻⁸	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<$ 6.8 $\times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<$ 8.0 $\times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<$ 2.5 $\times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<$15 $\times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^+ K^- K^-)/\Gamma_{total}$ — Γ_{231}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$4.7 × 10⁻⁸	90	MIYAZAKI	13	BELL	854 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<$9.6 $\times 10^{-8}$	90	MIYAZAKI	10	BELL	Repl. by MIYAZAKI 13
$<$4.4 $\times 10^{-7}$	90	YUSA	06	BELL	158 fb^{-1} E^{ee}_{cm} = 10.6 GeV
$<$4.8 $\times 10^{-7}$	90	AUBERT,BE	05D	BABR	221 fb^{-1}, E^{ee}_{cm}= 10.6 GeV
$<$6.0 $\times 10^{-6}$	90	BLISS	98	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^- \pi^0 \pi^0)/\Gamma_{total}$ — Γ_{232}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$6.5 × 10⁻⁶	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- \pi^0 \pi^0)/\Gamma_{total}$ — Γ_{233}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$14 × 10⁻⁶	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^- \eta\eta)/\Gamma_{total}$ — Γ_{234}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$35 × 10⁻⁶	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- \eta\eta)/\Gamma_{total}$ — Γ_{235}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$60 × 10⁻⁶	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^- \pi^0 \eta)/\Gamma_{total}$ — Γ_{236}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$24 × 10⁻⁶	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\mu^- \pi^0 \eta)/\Gamma_{total}$ — Γ_{237}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<$22 × 10⁻⁶	90	BONVICINI	97	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(p e^- e^-)/\Gamma_{total}$ **Γ_{238}/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.0 \times 10^{-8}$	90	SAHOO	20	BELL	921 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(\overline{p} e^+ e^-)/\Gamma_{total}$ **Γ_{239}/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.0 \times 10^{-8}$	90	SAHOO	20	BELL	921 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(\overline{p} e^+ \mu^-)/\Gamma_{total}$ **Γ_{240}/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.0 \times 10^{-8}$	90	SAHOO	20	BELL	921 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(\overline{p} e^- \mu^+)/\Gamma_{total}$ **Γ_{241}/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.8 \times 10^{-8}$	90	SAHOO	20	BELL	921 fb^{-1} E^{ee}_{cm} = 10.6 GeV

$\Gamma(p \mu^- \mu^-)/\Gamma_{total}$ **Γ_{242}/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.0 \times 10^{-8}$	90	SAHOO	20	BELL	921 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<4.4 \times 10^{-7}$	90	AAIJ	13AH	LHCB	1.0 fb^{-1}, pp at 7 TeV

$\Gamma(\overline{p} \mu^+ \mu^-)/\Gamma_{total}$ **Γ_{243}/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.8 \times 10^{-8}$	90	SAHOO	20	BELL	921 fb^{-1} E^{ee}_{cm} = 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.3 \times 10^{-7}$	90	AAIJ	13AH	LHCB	1.0 fb^{-1}, pp at 7 TeV

$\Gamma(\overline{p} \gamma)/\Gamma_{total}$ **Γ_{244}/Γ**

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$< 3.5 \times 10^{-6}$	90	GODANG	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<29 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV

$\Gamma(\overline{p} \pi^0)/\Gamma_{total}$ **Γ_{245}/Γ**

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<15 \times 10^{-6}$	90	GODANG	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<66 \times 10^{-5}$	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV

$\Gamma(\overline{p} 2\pi^0)/\Gamma_{total}$ **Γ_{246}/Γ**

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<33 \times 10^{-6}$	90	GODANG	99	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\overline{p}\eta)/\Gamma_{total}$ — Γ_{247}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 8.9 × 10^−6	90	GODANG	99	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<130 × 10^−5	90	ALBRECHT	92K	ARG	E^{ee}_{cm}= 10 GeV

$\Gamma(\overline{p}\pi^0\eta)/\Gamma_{total}$ — Γ_{248}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<27 × 10^−6	90	GODANG	99	CLEO	E^{ee}_{cm}= 10.6 GeV

$\Gamma(\Lambda\pi^-)/\Gamma_{total}$ — Γ_{249}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.72 × 10^−7	90	MIYAZAKI	06	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(\overline{\Lambda}\pi^-)/\Gamma_{total}$ — Γ_{250}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.4 × 10^−7	90	MIYAZAKI	06	BELL	154 fb^{-1}, E^{ee}_{cm}= 10.6 GeV

$\Gamma(e^-$ light boson$)/\Gamma(e^-\overline{\nu}_e\nu_\tau)$ — Γ_{251}/Γ_5

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.3 × 10^−3	95	[1] ADACHI	23A	BELL	E^{ee}_{cm}= 10.58 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.008	95	[2] BRYMAN	21	RVUE	
<0.015	95	[3] ALBRECHT	95G	ARG	E^{ee}_{cm} = 9.4–10.6 GeV
<0.018	95	[4] ALBRECHT	90E	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
<0.040	95	[5] BALTRUSAIT...	85	MRK3	E^{ee}_{cm}= 3.77 GeV

[1] ADACHI 23A limit holds for bosons with mass = 0.0 GeV. The limit rises to 9.7×10^{-3} for a mass of 1.0 GeV, then falls to 1.1×10^{-3} at the upper mass limit of 1.6 GeV.

[2] BRYMAN 21 reports indirect limits obtained from the consistency of the world averages of B($\tau^- \rightarrow e^-\overline{\nu}_e\nu_\tau$) and B($\tau^- \rightarrow \mu^-\overline{\nu}_\mu\nu_\tau$) with their Standard Model predictions, without a simulation of the efficiency as a function of the X mass for the searched decay modes to be detected as the corresponding Standard Model decay modes.

[3] ALBRECHT 95G limit holds for bosons with mass < 0.4 GeV. The limit rises to 0.036 for a mass of 1.0 GeV, then falls to 0.006 at the upper mass limit of 1.6 GeV.

[4] ALBRECHT 90E limit applies for spinless boson with mass < 100 MeV, and rises to 0.050 for mass = 500 MeV.

[5] BALTRUSAITIS 85 limit applies for spinless boson with mass < 100 MeV.

$\Gamma(\mu^-$ light boson$)/\Gamma(e^-\overline{\nu}_e\nu_\tau)$ — Γ_{252}/Γ_5

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.4 × 10^−3	95	[1] ADACHI	23A	BELL	E^{ee}_{cm}= 10.58 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.011	95	[2] BRYMAN	21	RVUE	
<0.026	95	[3] ALBRECHT	95G	ARG	E^{ee}_{cm} = 9.4–10.6 GeV
<0.033	95	[4] ALBRECHT	90E	ARG	E^{ee}_{cm} = 9.4–10.6 GeV
<0.125	95	[5] BALTRUSAIT...	85	MRK3	E^{ee}_{cm} = 3.77 GeV

[1] ADACHI 23A limit holds for bosons with mass = 0.0 GeV. The limit rises to 12.2×10^{-3} for a mass of 1.0 GeV, then falls to 0.7×10^{-3} at the upper mass limit of 1.6 GeV.

[2] BRYMAN 21 reports indirect limits obtained from the consistency of the world averages of B($\tau^- \rightarrow e^- \overline{\nu}_e \nu_\tau$) and B($\tau^- \rightarrow \mu^- \overline{\nu}_\mu \nu_\tau$) with their Standard Model predictions, without a simulation of the efficiency as a function of the X mass for the searched decay modes to be detected as the corresponding Standard Model decay modes.

[3] ALBRECHT 95G limit holds for bosons with mass < 1.3 GeV. The limit rises to 0.034 for a mass of 1.4 GeV, then falls to 0.003 at the upper mass limit of 1.6 GeV.

[4] ALBRECHT 90E limit applies for spinless boson with mass < 100 MeV, and rises to 0.071 for mass = 500 MeV.

[5] BALTRUSAITIS 85 limit applies for spinless boson with mass < 100 MeV.

τ-DECAY PARAMETERS

See the related review(s):

τ-Lepton Decay Parameters

ρ(e or μ) PARAMETER

($V-A$) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.745±0.008 OUR FIT					
0.749±0.008 OUR AVERAGE					
0.742±0.014±0.006	81k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.775±0.023±0.020	36k	ABREU	00L	DLPH	1992–1995 runs
0.781±0.028±0.018	46k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.762±0.035	54k	ACCIARRI	98R	L3	1991–1995 LEP runs
0.731±0.031		[1] ALBRECHT	98	ARG	E^{ee}_{cm} = 9.5–10.6 GeV
0.72 ±0.09 ±0.03		[2] ABE	97O	SLD	1993–1995 SLC runs
0.747±0.010±0.006	55k	ALEXANDER	97F	CLEO	E^{ee}_{cm} = 10.6 GeV
0.79 ±0.10 ±0.10	3732	FORD	87B	MAC	E^{ee}_{cm} = 29 GeV
0.71 ±0.09 ±0.03	1426	BEHRENDS	85	CLEO	$e^+ e^-$ near $\Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.735±0.013±0.008	31k	AMMAR	97B	CLEO	Repl. by ALEXANDER 97F
0.794±0.039±0.031	18k	ACCIARRI	96H	L3	Repl. by ACCIARRI 98R
0.732±0.034±0.020	8.2k	[3] ALBRECHT	95	ARG	E^{ee}_{cm} = 9.5–10.6 GeV
0.738±0.038		[4] ALBRECHT	95C	ARG	Repl. by ALBRECHT 98
0.751±0.039±0.022		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
0.742±0.035±0.020	8000	ALBRECHT	90E	ARG	E^{ee}_{cm} = 9.4–10.6 GeV

[1] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \overline{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \overline{\nu}_\tau)$, and their charged conjugates.

[2] ABE 97O assume $\eta = 0$ in their fit. Letting η vary in the fit gives a ρ value of 0.69 ± 0.13 ± 0.05.

[3] Value is from a simultaneous fit for the ρ and η decay parameters to the lepton energy spectrum. Not independent of ALBRECHT 90E ρ(e or μ) value which assumes $\eta = 0$. Result is strongly correlated with ALBRECHT 95C.

[4] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E.

$\rho(e)$ PARAMETER

($V-A$) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.747±0.010 OUR FIT					
0.744±0.010 OUR AVERAGE					
0.747±0.019±0.014	44k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.744±0.036±0.037	17k	ABREU	00L	DLPH	1992–1995 runs
0.779±0.047±0.029	25k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.68 ±0.04 ±0.07		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.71 ±0.14 ±0.05		ABE	97O	SLD	1993–1995 SLC runs
0.747±0.012±0.004	34k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
0.735±0.036±0.020	4.7k	[2] ALBRECHT	95	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.79 ±0.08 ±0.06	3230	[3] ALBRECHT	93G	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
0.64 ±0.06 ±0.07	2753	JANSSEN	89	CBAL	E^{ee}_{cm}= 9.4–10.6 GeV
0.62 ±0.17 ±0.14	1823	FORD	87B	MAC	E^{ee}_{cm}= 29 GeV
0.60 ±0.13	699	BEHRENDS	85	CLEO	e^+e^- near $\Upsilon(4S)$
0.72 ±0.10 ±0.11	594	BACINO	79B	DLCO	E^{ee}_{cm}= 3.5–7.4 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.732±0.014±0.009	19k	AMMAR	97B	CLEO	Repl. by ALEXANDER 97F
0.793±0.050±0.025		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
0.747±0.045±0.028	5106	ALBRECHT	90E	ARG	Repl. by ALBRECHT 95

[1] ALBRECHT 98 use tau pair events of the type $\tau^-\tau^+ \to (\ell^-\overline{\nu}_\ell\nu_\tau)(\pi^+\pi^0\overline{\nu}_\tau)$, and their charged conjugates.

[2] ALBRECHT 95 use tau pair events of the type $\tau^-\tau^+ \to (\ell^-\overline{\nu}_\ell\nu_\tau)(h^+h^-h^+(\pi^0)\overline{\nu}_\tau)$ and their charged conjugates.

[3] ALBRECHT 93G use tau pair events of the type $\tau^-\tau^+ \to (\mu^-\overline{\nu}_\mu\nu_\tau)(e^+\nu_e\overline{\nu}_\tau)$ and their charged conjugates.

$\rho(\mu)$ PARAMETER

($V-A$) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.763±0.020 OUR FIT					
0.770±0.022 OUR AVERAGE					
0.776±0.045±0.019	46k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.999±0.098±0.045	22k	ABREU	00L	DLPH	1992–1995 runs
0.777±0.044±0.016	27k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.69 ±0.06 ±0.06		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.54 ±0.28 ±0.14		ABE	97O	SLD	1993–1995 SLC runs
0.750±0.017±0.045	22k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
0.76 ±0.07 ±0.08	3230	ALBRECHT	93G	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
0.734±0.055±0.027	3041	ALBRECHT	90E	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
0.89 ±0.14 ±0.08	1909	FORD	87B	MAC	E^{ee}_{cm}= 29 GeV
0.81 ±0.13	727	BEHRENDS	85	CLEO	e^+e^- near $\Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.747±0.048±0.044	13k	AMMAR	97B	CLEO	Repl. by ALEXANDER 97F
0.693±0.057±0.028		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] ALBRECHT 98 use tau pair events of the type $\tau^-\tau^+ \rightarrow (\ell^-\overline{\nu}_\ell\nu_\tau)(\pi^+\pi^0\overline{\nu}_\tau)$, and their charged conjugates.

ξ(e or μ) PARAMETER

$(V-A)$ theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.985±0.030 OUR FIT					
0.981±0.031 OUR AVERAGE					
0.986±0.068±0.031	81k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.929±0.070±0.030	36k	ABREU	00L	DLPH	1992–1995 runs
0.98 ±0.22 ±0.10	46k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.70 ±0.16	54k	ACCIARRI	98R	L3	1991–1995 LEP runs
1.03 ±0.11		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
1.05 ±0.35 ±0.04		[2] ABE	97O	SLD	1993–1995 SLC runs
1.007±0.040±0.015	55k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.94 ±0.21 ±0.07	18k	ACCIARRI	96H	L3	Repl. by ACCIARRI 98R
0.97 ±0.14		[3] ALBRECHT	95C	ARG	Repl. by ALBRECHT 98
1.18 ±0.15 ±0.16		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
0.90 ±0.15 ±0.10	3230	[4] ALBRECHT	93G	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

[1] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^-\tau^+ \rightarrow (\ell^-\overline{\nu}_\ell\nu_\tau)(\pi^+\pi^0\overline{\nu}_\tau)$, and their charged conjugates.

[2] ABE 97O assume $\eta = 0$ in their fit. Letting η vary in the fit gives a ξ value of 1.02 ± 0.36 ± 0.05.

[3] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 95C uses events of the type $\tau^-\tau^+ \rightarrow (\ell^-\overline{\nu}_\ell\nu_\tau)\,(h^+h^-h^+\overline{\nu}_\tau)$ and their charged conjugates.

[4] ALBRECHT 93G measurement determines $|\xi|$ for the case $\xi(e) = \xi(\mu)$, but the authors point out that other LEP experiments determine the sign to be positive.

ξ(e) PARAMETER

$(V-A)$ theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.994±0.040 OUR FIT					
1.00 ±0.04 OUR AVERAGE					
1.011±0.094±0.038	44k	HEISTER	01E	ALEP	1991–1995 LEP runs
1.01 ±0.12 ±0.05	17k	ABREU	00L	DLPH	1992–1995 runs
1.13 ±0.39 ±0.14	25k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
1.11 ±0.20 ±0.08		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
1.16 ±0.52 ±0.06		ABE	97O	SLD	1993–1995 SLC runs
0.979±0.048±0.016	34k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.03 ±0.23 ±0.09		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] ALBRECHT 98 use tau pair events of the type $\tau^-\tau^+ \rightarrow (\ell^-\overline{\nu}_\ell\nu_\tau)(\pi^+\pi^0\overline{\nu}_\tau)$, and their charged conjugates.

$\xi(\mu)$ PARAMETER

$(V-A)$ theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.030±0.059 OUR FIT					
1.06 ±0.06 OUR AVERAGE					
1.030±0.120±0.050	46k	HEISTER	01E	ALEP	1991–1995 LEP runs
1.16 ±0.19 ±0.06	22k	ABREU	00L	DLPH	1992–1995 runs
0.79 ±0.41 ±0.09	27k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
1.26 ±0.27 ±0.14		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.75 ±0.50 ±0.14		ABE	97O	SLD	1993–1995 SLC runs
1.054±0.069±0.047	22k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.23 ±0.22 ±0.10		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \overline{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \overline{\nu}_\tau)$, and their charged conjugates.

η(e or μ) PARAMETER

$(V-A)$ theory predicts $\eta = 0$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.013±0.020 OUR FIT					
0.015±0.021 OUR AVERAGE					
0.012±0.026±0.004	81k	HEISTER	01E	ALEP	1991–1995 LEP runs
−0.005±0.036±0.037		ABREU	00L	DLPH	1992–1995 runs
0.027±0.055±0.005	46k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.27 ±0.14	54k	ACCIARRI	98R	L3	1991–1995 LEP runs
−0.13 ±0.47 ±0.15		ABE	97O	SLD	1993–1995 SLC runs
−0.015±0.061±0.062	31k	AMMAR	97B	CLEO	E^{ee}_{cm}= 10.6 GeV
0.03 ±0.18 ±0.12	8.2k	ALBRECHT	95	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.25 ±0.17 ±0.11	18k	ACCIARRI	96H	L3	Repl. by ACCIARRI 98R
−0.04 ±0.15 ±0.11		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

$\eta(\mu)$ PARAMETER

$(V-A)$ theory predicts $\eta = 0$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.094±0.073 OUR FIT					
0.17 ±0.15 OUR AVERAGE Error includes scale factor of 1.2.					
0.160±0.150±0.060	46k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.72 ±0.32 ±0.15		ABREU	00L	DLPH	1992–1995 runs
−0.59 ±0.82 ±0.45		[1] ABE	97O	SLD	1993–1995 SLC runs
0.010±0.149±0.171	13k	[2] AMMAR	97B	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.010±0.065±0.001	27k	[3] ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
−0.24 ±0.23 ±0.18		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] Highly correlated (corr. = 0.92) with ABE 97O $\rho(\mu)$ measurement.
[2] Highly correlated (corr. = 0.949) with AMMAR 97B $\rho(\mu)$ value.
[3] ACKERSTAFF 99D result is dominated by a constraint on η from the OPAL measurements of the τ lifetime and B($\tau^- \rightarrow \mu^- \overline{\nu}_\mu \nu_\tau$) assuming lepton universality for the total coupling strength.

($\delta\xi$)(e or μ) PARAMETER

($V-A$) theory predicts ($\delta\xi$) = 0.75.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.746±0.021 OUR FIT					
0.744±0.022 OUR AVERAGE					
0.776±0.045±0.024	81k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.779±0.070±0.028	36k	ABREU	00L	DLPH	1992–1995 runs
0.65 ±0.14 ±0.07	46k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.70 ±0.11	54k	ACCIARRI	98R	L3	1991–1995 LEP runs
0.63 ±0.09		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.88 ±0.27 ±0.04		[2] ABE	97O	SLD	1993–1995 SLC runs
0.745±0.026±0.009	55k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.81 ±0.14 ±0.06	18k	ACCIARRI	96H	L3	Repl. by ACCIARRI 98R
0.65 ±0.12		[3] ALBRECHT	95C	ARG	Repl. by ALBRECHT 98
0.88 ±0.11 ±0.07		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^-\tau^+ \to (\ell^-\overline{\nu}_\ell\nu_\tau)(\pi^+\pi^0\overline{\nu}_\tau)$, and their charged conjugates.

[2] ABE 97O assume η = 0 in their fit. Letting η vary in the fit gives a ($\delta\xi$) value of 0.87 ± 0.27 ± 0.04.

[3] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 95C uses events of the type $\tau^-\tau^+ \to (\ell^-\overline{\nu}_\ell\nu_\tau)\,(h^+h^-h^+\overline{\nu}_\tau)$ and their charged conjugates.

($\delta\xi$)(e) PARAMETER

($V-A$) theory predicts ($\delta\xi$) = 0.75.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.734±0.028 OUR FIT					
0.731±0.029 OUR AVERAGE					
0.778±0.066±0.024	44k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.85 ±0.12 ±0.04	17k	ABREU	00L	DLPH	1992–1995 runs
0.72 ±0.31 ±0.14	25k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.56 ±0.14 ±0.06		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.85 ±0.43 ±0.08		ABE	97O	SLD	1993–1995 SLC runs
0.720±0.032±0.010	34k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.11 ±0.17 ±0.07		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] ALBRECHT 98 use tau pair events of the type $\tau^-\tau^+ \to (\ell^-\overline{\nu}_\ell\nu_\tau)(\pi^+\pi^0\overline{\nu}_\tau)$, and their charged conjugates.

($\delta\xi$)(μ) PARAMETER

($V-A$) theory predicts ($\delta\xi$) = 0.75.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.778±0.037 OUR FIT					
0.79 ±0.04 OUR AVERAGE					
0.786±0.066±0.028	46k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.86 ±0.13 ±0.04	22k	ABREU	00L	DLPH	1992–1995 runs
0.63 ±0.23 ±0.05	27k	ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.73 ±0.18 ±0.10		[1] ALBRECHT	98	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
0.82 ±0.32 ±0.07		ABE	97O	SLD	1993–1995 SLC runs
0.786±0.041±0.032	22k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.71 ±0.14 ±0.06		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \to (\ell^- \overline{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \overline{\nu}_\tau)$, and their charged conjugates.

ξ(π) PARAMETER

$(V-A)$ theory predicts $\xi(\pi) = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.993±0.022 OUR FIT					
0.994±0.023 OUR AVERAGE					
0.994±0.020±0.014	27k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.81 ±0.17 ±0.02		ABE	97O	SLD	1993–1995 SLC runs
1.03 ±0.06 ±0.04	2.0k	COAN	97	CLEO	E^{ee}_{cm}= 10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.987±0.057±0.027		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
0.95 ±0.11 ±0.05		[1] BUSKULIC	94D	ALEP	1990+1991 LEP run

[1] Superseded by BUSKULIC 95D.

ξ(ρ) PARAMETER

$(V-A)$ theory predicts $\xi(\rho) = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.994±0.008 OUR FIT					
0.994±0.009 OUR AVERAGE					
0.987±0.012±0.011	59k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.99 ±0.12 ±0.04		ABE	97O	SLD	1993–1995 SLC runs
0.995±0.010±0.003	66k	ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
1.022±0.028±0.030	1.7k	[1] ALBRECHT	94E	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.045±0.058±0.032		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
1.03 ±0.11 ±0.05		[2] BUSKULIC	94D	ALEP	1990+1991 LEP run

[1] ALBRECHT 94E measure the square of this quantity and use the sign determined by ALBRECHT 90I to obtain the quoted result.

[2] Superseded by BUSKULIC 95D.

ξ(a_1) PARAMETER

$(V-A)$ theory predicts $\xi(a_1) = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.001±0.027 OUR FIT					
1.002±0.028 OUR AVERAGE					
1.000±0.016±0.024	35k	[1] HEISTER	01E	ALEP	1991–1995 LEP runs
1.02 ±0.13 ±0.03	17.2k	ASNER	00	CLEO	E^{ee}_{cm}= 10.6 GeV
1.29 ±0.26 ±0.11	7.4k	[2] ACKERSTAFF	97R	OPAL	1992–1994 LEP runs
0.85 $^{+0.15}_{-0.17}$ ±0.05		ALBRECHT	95C	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
1.25 ±0.23 $^{+0.15}_{-0.08}$	7.5k	ALBRECHT	93C	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.08\ {}^{+0.46}_{-0.41}\ {}^{+0.14}_{-0.25}$	2.6k	[3] AKERS	95P	OPAL	Repl. by ACKERSTAFF 97R
$0.937 \pm 0.116 \pm 0.064$		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

[1] HEISTER 01E quote $1.000 \pm 0.016 \pm 0.013 \pm 0.020$ where the errors are statistical, systematic, and an uncertainty due to the final state model. We combine the systematic error and model uncertainty.

[2] ACKERSTAFF 97R obtain this result with a model independent fit to the hadronic structure functions. Fitting with the model of Kuhn and Santamaria (ZPHY **C48**, 445 (1990)) gives $0.87 \pm 0.16 \pm 0.04$, and with the model of of Isgur *et al.* (PR **D39**,1357 (1989)) they obtain $1.20 \pm 0.21 \pm 0.14$.

[3] AKERS 95P obtain this result with a model independent fit to the hadronic structure functions. Fitting with the model of Kuhn and Santamaria (ZPHY **C48**, 445 (1990)) gives $0.87 \pm 0.27^{+0.05}_{-0.06}$, and with the model of of Isgur *et al.* (PR **D39**,1357 (1989)) they obtain $1.10 \pm 0.31^{+0.13}_{-0.14}$.

ξ(all hadronic modes) PARAMETER

$(V-A)$ theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.995±0.007 OUR FIT					
0.997±0.007 OUR AVERAGE					
$0.992 \pm 0.007 \pm 0.008$	102k	[1] HEISTER	01E	ALEP	1991–1995 LEP runs
$0.997 \pm 0.027 \pm 0.011$	39k	[2] ABREU	00L	DLPH	1992–1995 runs
$1.02 \pm 0.13 \pm 0.03$	17.2k	[3] ASNER	00	CLEO	E^{ee}_{cm}= 10.6 GeV
1.032 ± 0.031	37k	[4] ACCIARRI	98R	L3	1991–1995 LEP runs
$0.93 \pm 0.10 \pm 0.04$		ABE	97O	SLD	1993–1995 SLC runs
$1.29 \pm 0.26 \pm 0.11$	7.4k	[5] ACKERSTAFF	97R	OPAL	1992–1994 LEP runs
$0.995 \pm 0.010 \pm 0.003$	66k	[6] ALEXANDER	97F	CLEO	E^{ee}_{cm}= 10.6 GeV
$1.03 \pm 0.06 \pm 0.04$	2.0k	[7] COAN	97	CLEO	E^{ee}_{cm}= 10.6 GeV
1.017 ± 0.039		[8] ALBRECHT	95C	ARG	E^{ee}_{cm}= 9.5–10.6 GeV
$1.25 \pm 0.23\ {}^{+0.15}_{-0.08}$	7.5k	[9] ALBRECHT	93C	ARG	E^{ee}_{cm}= 9.4–10.6 GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.970 \pm 0.053 \pm 0.011$	14k	[10] ACCIARRI	96H	L3	Repl. by ACCIARRI 98R
$1.08\ {}^{+0.46}_{-0.41}\ {}^{+0.14}_{-0.25}$	2.6k	[11] AKERS	95P	OPAL	Repl. by ACKERSTAFF 97R
$1.006 \pm 0.032 \pm 0.019$		[12] BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
$1.022 \pm 0.028 \pm 0.030$	1.7k	[13] ALBRECHT	94E	ARG	E^{ee}_{cm}= 9.4–10.6 GeV
$0.99 \pm 0.07 \pm 0.04$		[14] BUSKULIC	94D	ALEP	1990+1991 LEP run
$1.14 \pm 0.34\ {}^{+0.34}_{-0.17}$	3.9k	[9] ALBRECHT	90I	ARG	Repl. by ALBRECHT 93C

[1] HEISTER 01E quote $0.992 \pm 0.007 \pm 0.006 \pm 0.005$ where the errors are statistical, systematic, and an uncertainty due to the final state model. We combine the systematic error and model uncertainty. They use $\tau \to \pi\nu_\tau$, $\tau \to K\nu_\tau$, $\tau \to \rho\nu_\tau$, and $\tau \to a_1\nu_\tau$ decays.

[2] ABREU 00L use $\tau^- \to h^- \geq 0\pi^0\nu_\tau$ decays.

[3] ASNER 00 use $\tau^- \to \pi^- 2\pi^0\nu_\tau$ decays.

[4] ACCIARRI 98R use $\tau \to \pi\nu_\tau$, $\tau \to K\nu_\tau$, and $\tau \to \rho\nu_\tau$ decays.

[5] ACKERSTAFF 97R use $\tau \to a_1\nu_\tau$ decays.

[6] ALEXANDER 97F use $\tau \to \rho\nu_\tau$ decays.

[7] COAN 97 use $h^+ h^-$ energy correlations.
[8] Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E.
[9] Uses $\tau \to a_1 \nu_\tau$ decays. Replaced by ALBRECHT 95C.
[10] ACCIARRI 96H use $\tau \to \pi \nu_\tau$, $\tau \to K \nu_\tau$, and $\tau \to \rho \nu_\tau$ decays.
[11] AKERS 95P use $\tau \to a_1 \nu_\tau$ decays.
[12] BUSKULIC 95D use $\tau \to \pi \nu_\tau$, $\tau \to \rho \nu_\tau$, and $\tau \to a_1 \nu_\tau$ decays.
[13] ALBRECHT 94E measure the square of this quantity and use the sign determined by ALBRECHT 90I to obtain the quoted result. Uses $\tau \to a_1 \nu_\tau$ decays. Replaced by ALBRECHT 95C.
[14] BUSKULIC 94D use $\tau \to \pi \nu_\tau$ and $\tau \to \rho \nu_\tau$ decays. Superseded by BUSKULIC 95D.

$\xi'(\mu)$ PARAMETER

$(V-A)$ theory predicts $\xi' = 1$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.22±0.94±0.42	165	BODROV	23	BELL	$E^{ee}_{cm} = 10.6$ GeV

$\overline{\eta}(\mu)$ PARAMETER

$(V-A)$ theory predicts $\overline{\eta}(\mu) = 0$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−1.3±1.5±0.8	71k	[1] SHIMIZU	18A	BELL	$\tau^- \to \nu_\tau \mu^- \overline{\nu}_\mu \gamma$

[1] SHIMIZU 18A measurement procedure fits a distribution affected by $\overline{\eta}(\mu)$, $\xi\kappa(\mu)$ and $\eta''(\mu)$, floating $\overline{\eta}(\mu)$ and $\xi\kappa(\mu)$ and fixing $\eta''(\mu) = 0$. The contribution of $\eta''(\mu)$ is suppressed by m_μ/m_τ.

$(\xi\kappa)(e \text{ or } \mu)$ PARAMETER

$(V-A)$ theory predicts $(\xi\kappa)(e$ or $\mu) = 0$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.5±0.4±0.2	149k	[1,2] SHIMIZU	18A	BELL	$\tau^- \to \nu_\tau e^- \overline{\nu}_e \gamma$ and $\tau^- \to \nu_\tau \mu^- \overline{\nu}_\mu \gamma$

[1] SHIMIZU 18A measurement procedure fits a distribution of radiative tau decays into both electrons and muons affected by $\overline{\eta}(e$ or $\mu)$, $\xi\kappa(e$ or $\mu)$ and $\eta''(e$ or $\mu)$, floating $\overline{\eta}(e$ or $\mu)$ and $\xi\kappa(e$ or $\mu)$ and fixing $\eta''(e$ or $\mu) = 0$. The contribution of $\eta''(e$ or $\mu)$ is suppressed by m_e/m_τ for tau decaying to electrons and by m_μ/m_τ for tau decaying to muons.
[2] Error correlated with SHIMIZU 18A $(\xi\kappa)(e)$ and $(\xi\kappa)(\mu)$ values.

$(\xi\kappa)(e)$ PARAMETER

$(V-A)$ theory predicts $(\xi\kappa)(e) = 0$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.4±0.8±0.9	78k	[1,2] SHIMIZU	18A	BELL	$\tau^- \to \nu_\tau e^- \overline{\nu}_e \gamma$

[1] SHIMIZU 18A measurement procedure fits a distribution affected by $\overline{\eta}(e)$, $(\xi\kappa)(e)$ and $\eta''(e)$, floating $(\xi\kappa)(e)$ and fixing $\overline{\eta}(e) = 0$ and $\eta''(e) = 0$. The contribution of $\eta''(e)$ is suppressed by m_e/m_τ.
[2] Error correlated with SHIMIZU 18A $(\xi\kappa)(e$ or $\mu)$ value.

$(\xi\kappa)(\mu)$ PARAMETER

$(V-A)$ theory predicts $(\xi\kappa)(\mu) = 0$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.8±0.5±0.3	71k	[1,2] SHIMIZU	18A	BELL	$\tau^- \to \nu_\tau \mu^- \overline{\nu}_\mu \gamma$

[1] SHIMIZU 18A measurement procedure fits a distribution affected by $\overline{\eta}(\mu)$, $\xi\kappa(\mu)$ and $\eta''(\mu)$, floating $\overline{\eta}(\mu)$ and $\xi\kappa(\mu)$ and fixing $\eta''(\mu) = 0$. The contribution of $\eta''(\mu)$ is suppressed by m_μ/m_τ.

[2] Error correlated with SHIMIZU 18A $(\xi\kappa)(e$ or $\mu)$ value.

τ REFERENCES

AAD	23BM	PRL 131 151802	G. Aad et al.	(ATLAS Collab.)
ADACHI	23A	PRL 130 181803	I. Adachi et al.	(BELLE II Collab.)
ADACHI	23C	PR D108 032006	I. Adachi et al.	(BELLE II Collab.)
ANASHIN	23A	PPN 54 185	V.V. Anashin et al.	(VEPP-4M KEDR Collab.)
BODROV	23	PRL 131 021801	D. Bodrov et al.	(BELLE Collab.)
Also		PR D108 012003	D. Bodrov et al.	(BELLE Collab.)
TSUZUKI	23	JHEP 2306 118	N. Tsuzuki et al.	(BELLE Collab.)
TUMASYAN	23AS	PRL 131 151803	A. Tumasyan et al.	(CMS Collab.)
INAMI	22	JHEP 2204 110	K. Inami et al.	(BELLE Collab.)
BRYMAN	21	PR D104 075032	D.A. Bryman, S. Ito, R. Shrock	(BRCO, TRIU+)
SIRUNYAN	21D	JHEP 2101 163	A.M. Sirunyan et al.	(CMS Collab.)
UNO	21	JHEP 2110 019	K. Uno et al.	(BELLE Collab.)
SAHOO	20	PR D102 111101	D. Sahoo et al.	(BELLE Collab.)
JIN	19	PR D100 071101	Y. Jin et al.	(BELLE Collab.)
LEES	18B	PR D98 032010	J.P. Lees et al.	(BABAR Collab.)
SHIMIZU	18A	PTEP 2018 023C01	N. Shimizu et al.	(BELLE Collab.)
AAD	16BA	EPJ C76 232	G.Aad et al.	(ATLAS Collab.)
AAIJ	15AI	JHEP 1502 121	R. Aaij et al.	(LHCb Collab.)
LEES	15G	PR D91 051103	J.P. Lees et al.	(BABAR Collab.)
ABLIKIM	14D	PR D90 012001	M. Ablikim et al.	(BESIII Collab.)
BELOUS	14	PRL 112 031801	K. Belous et al.	(BELLE Collab.)
LEVICHEV	14	SPU 57 66	E.B. Levichev et al.	
RYU	14	PR D89 072009	S. Ryu et al.	(BELLE Collab.)
AAIJ	13AH	PL B724 36	R. Aaij et al.	(LHCb Collab.)
MIYAZAKI	13	PL B719 346	Y. Miyazaki et al.	(BELLE Collab.)
LEES	12M	PR D85 031102	J.P. Lees et al.	(BABAR Collab.)
Also		PR D85 099904 (errat.)	J.P. Lees et al.	(BABAR Collab.)
LEES	12X	PR D86 092010	J.P. Lees et al.	(BABAR Collab.)
LEES	12Y	PR D86 092013	J.P. Lees et al.	(BABAR Collab.)
PDG	12	PR D86 010001	J. Beringer et al.	(PDG Collab.)
DEL-AMO-SA...	11E	PR D83 032002	P. del Amo Sanchez et al.	(BABAR Collab.)
MIYAZAKI	11	PL B699 251	Y. Miyazaki et al.	(BELLE Collab.)
AUBERT	10B	PRL 104 021802	B. Aubert et al.	(BABAR Collab.)
AUBERT	10F	PRL 105 051602	B. Aubert et al.	(BABAR Collab.)
HAYASAKA	10	PL B687 139	K. Hayasaka et al.	(BELLE Collab.)
LEE	10	PR D81 113007	M.J. Lee et al.	(BELLE Collab.)
LEES	10A	PR D81 111101	J.P. Lees et al.	(BABAR Collab.)
MIYAZAKI	10	PL B682 355	Y. Miyazaki et al.	(BELLE Collab.)
MIYAZAKI	10A	PL B692 4	Y. Miyazaki et al.	(BELLE Collab.)
AUBERT	09AK	PR D80 092005	B. Aubert et al.	(BABAR Collab.)
AUBERT	09D	PR D79 012004	B. Aubert et al.	(BABAR Collab.)
AUBERT	09W	PRL 103 021801	B. Aubert et al.	(BABAR Collab.)
GROZIN	09A	PAN 72 1203	A.G. Grozin, I.B. Khriplovich, A.S. Rudenko	(NOVO)
INAMI	09	PL B672 209	K. Inami et al.	(BELLE Collab.)
MIYAZAKI	09	PL B672 317	Y. Miyazaki et al.	(BELLE Collab.)
AUBERT	08	PRL 100 011801	B. Aubert et al.	(BABAR Collab.)
AUBERT	08AE	PR D77 112002	B. Aubert et al.	(BABAR Collab.)
AUBERT	08K	PRL 100 071802	B. Aubert et al.	(BABAR Collab.)
FUJIKAWA	08	PR D78 072006	M. Fujikawa et al.	(BELLE Collab.)
HAYASAKA	08	PL B666 16	K. Hayasaka et al.	(BELLE Collab.)
MIYAZAKI	08	PL B660 154	Y. Miyazaki et al.	(BELLE Collab.)
NISHIO	08	PL B664 35	Y. Nishio et al.	(BELLE Collab.)
ANASHIN	07	JETPL 85 347	V.V. Anashin et al.	(KEDR Collab.)
		Translated from ZETFP 85 429.		
AUBERT	07AP	PR D76 051104	B. Aubert et al.	(BABAR Collab.)
AUBERT	07BK	PRL 99 251803	B. Aubert et al.	(BABAR Collab.)
AUBERT	07I	PRL 98 061803	B. Aubert et al.	(BABAR Collab.)
BELOUS	07	PRL 99 011801	K. Belous et al.	(BELLE Collab.)
EIDELMAN	07	MPL A22 159	S. Eidelman, M. Passera	(NOVO, PADO)
EPIFANOV	07	PL B654 65	D. Epifanov et al.	(BELLE Collab.)
MIYAZAKI	07	PL B648 341	Y. Miyazaki et al.	(BELLE Collab.)
ABDALLAH	06A	EPJ C46 1	J. Abdallah et al.	(DELPHI Collab.)
AUBERT	06C	PRL 96 041801	B. Aubert et al.	(BABAR Collab.)
AUBERT,B	06	PR D73 112003	B. Aubert et al.	(BABAR Collab.)
INAMI	06	PL B643 5	K. Inami et al.	(BELLE Collab.)
MIYAZAKI	06	PL B632 51	Y. Miyazaki et al.	(BELLE Collab.)

MIYAZAKI	06A	PL B639 159	Y. Miyazaki *et al.*	(BELLE Collab.)
PDG	06	JP G33 1	W.-M. Yao *et al.*	(PDG Collab.)
YUSA	06	PL B640 138	Y. Yusa *et al.*	(BELLE Collab.)
ARMS	05	PRL 94 241802	K. Arms *et al.*	(CLEO Collab.)
AUBERT,B	05A	PRL 95 041802	B. Aubert *et al.*	(BABAR Collab.)
AUBERT,B	05F	PR D72 012003	B. Aubert *et al.*	(BABAR Collab.)
AUBERT,B	05W	PR D72 072001	B. Aubert *et al.*	(BABAR Collab.)
AUBERT,BE	05D	PRL 95 191801	B. Aubert *et al.*	(BABAR Collab.)
ENARI	05	PL B622 218	Y. Enari *et al.*	(BELLE Collab.)
HAYASAKA	05	PL B613 20	K. Hayasaka *et al.*	(BELLE Collab.)
SCHAEL	05C	PRPL 421 191	S. Schael *et al.*	(ALEPH Collab.)
ABBIENDI	04J	EPJ C35 437	G. Abbiendi *et al.*	(OPAL Collab.)
ABDALLAH	04K	EPJ C35 159	J. Abdallah *et al.*	(DELPHI Collab.)
ABDALLAH	04T	EPJ C36 283	J. Abdallah *et al.*	(DELPHI Collab.)
ABE	04B	PRL 92 171802	K. Abe *et al.*	(BELLE Collab.)
ACHARD	04G	PL B585 53	P. Achard *et al.*	(L3 Collab.)
AUBERT	04J	PRL 92 121801	B. Aubert *et al.*	(BABAR Collab.)
ENARI	04	PRL 93 081803	Y. Enari *et al.*	(BELLE Collab.)
PDG	04	PL B592 1	S. Eidelman *et al.*	(PDG Collab.)
YUSA	04	PL B589 103	Y. Yusa *et al.*	(BELLE Collab.)
ABBIENDI	03	PL B551 35	G. Abbiendi *et al.*	(OPAL Collab.)
BRIERE	03	PRL 90 181802	R. A. Briere *et al.*	(CLEO Collab.)
HEISTER	03F	EPJ C30 291	A. Heister *et al.*	(ALEPH Collab.)
INAMI	03	PL B551 16	K. Inami *et al.*	(BELLE Collab.)
CHEN	02C	PR D66 071101	S. Chen *et al.*	(CLEO Collab.)
REGAN	02	PRL 88 071805	B.C. Regan *et al.*	
ABBIENDI	01J	EPJ C19 653	G. Abbiendi *et al.*	(OPAL Collab.)
ABREU	01M	EPJ C20 617	P. Abreu *et al.*	(DELPHI Collab.)
ACCIARRI	01F	PL B507 47	M. Acciarri *et al.*	(L3 Collab.)
ACHARD	01D	PL B519 189	P. Achard *et al.*	(L3 Collab.)
ANASTASSOV	01	PRL 86 4467	A. Anastassov *et al.*	(CLEO Collab.)
HEISTER	01E	EPJ C22 217	A. Heister *et al.*	(ALEPH Collab.)
ABBIENDI	00A	PL B492 23	G. Abbiendi *et al.*	(OPAL Collab.)
ABBIENDI	00C	EPJ C13 213	G. Abbiendi *et al.*	(OPAL Collab.)
ABBIENDI	00D	EPJ C13 197	G. Abbiendi *et al.*	(OPAL Collab.)
ABREU	00L	EPJ C16 229	P. Abreu *et al.*	(DELPHI Collab.)
ACCIARRI	00B	PL B479 67	M. Acciarri *et al.*	(L3 Collab.)
AHMED	00	PR D61 071101	S. Ahmed *et al.*	(CLEO Collab.)
ALBRECHT	00	PL B485 37	H. Albrecht *et al.*	(ARGUS Collab.)
ASNER	00	PR D61 012002	D.M. Asner *et al.*	(CLEO Collab.)
ASNER	00B	PR D62 072006	D.M. Asner *et al.*	(CLEO Collab.)
BERGFELD	00	PRL 84 830	T. Bergfeld *et al.*	(CLEO Collab.)
BROWDER	00	PR D61 052004	T.E. Browder *et al.*	(CLEO Collab.)
EDWARDS	00A	PR D61 072003	K.W. Edwards *et al.*	(CLEO Collab.)
GONZALEZ-S...	00	NP B582 3	G.A. Gonzalez-Sprinberg *et al.*	
ABBIENDI	99H	PL B447 134	G. Abbiendi *et al.*	(OPAL Collab.)
ABREU	99X	EPJ C10 201	P. Abreu *et al.*	(DELPHI Collab.)
ACKERSTAFF	99D	EPJ C8 3	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	99E	EPJ C8 183	K. Ackerstaff *et al.*	(OPAL Collab.)
BARATE	99K	EPJ C10 1	R. Barate *et al.*	(ALEPH Collab.)
BARATE	99R	EPJ C11 599	R. Barate *et al.*	(ALEPH Collab.)
BISHAI	99	PRL 82 281	M. Bishai *et al.*	(CLEO Collab.)
GODANG	99	PR D59 091303	R. Godang *et al.*	(CLEO Collab.)
RICHICHI	99	PR D60 112002	S.J. Richichi *et al.*	(CLEO Collab.)
ACCIARRI	98C	PL B426 207	M. Acciarri *et al.*	(L3 Collab.)
ACCIARRI	98E	PL B434 169	M. Acciarri *et al.*	(L3 Collab.)
ACCIARRI	98R	PL B438 405	M. Acciarri *et al.*	(L3 Collab.)
ACKERSTAFF	98M	EPJ C4 193	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	98N	PL B431 188	K. Ackerstaff *et al.*	(OPAL Collab.)
ALBRECHT	98	PL B431 179	H. Albrecht *et al.*	(ARGUS Collab.)
BARATE	98	EPJ C1 65	R. Barate *et al.*	(ALEPH Collab.)
BARATE	98E	EPJ C4 29	R. Barate *et al.*	(ALEPH Collab.)
BLISS	98	PR D57 5903	D.W. Bliss *et al.*	(CLEO Collab.)
ABE	97O	PRL 78 4691	K. Abe *et al.*	(SLD Collab.)
ACKERSTAFF	97J	PL B404 213	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	97L	ZPHY C74 403	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	97R	ZPHY C75 593	K. Ackerstaff *et al.*	(OPAL Collab.)
ALEXANDER	97F	PR D56 5320	J.P. Alexander *et al.*	(CLEO Collab.)
AMMAR	97B	PRL 78 4686	R. Ammar *et al.*	(CLEO Collab.)
ANASTASSOV	97	PR D55 2559	A. Anastassov *et al.*	(CLEO Collab.)
Also		PR D58 119903 (errat.)	A. Anastassov *et al.*	(CLEO Collab.)

ANDERSON	97	PRL 79 3814	S. Anderson *et al.*	(CLEO Collab.)
AVERY	97	PR D55 1119	P. Avery *et al.*	(CLEO Collab.)
BARATE	97I	ZPHY C74 387	R. Barate *et al.*	(ALEPH Collab.)
BARATE	97R	PL B414 362	R. Barate *et al.*	(ALEPH Collab.)
BERGFELD	97	PRL 79 2406	T. Bergfeld *et al.*	(CLEO Collab.)
BONVICINI	97	PRL 79 1221	G. Bonvicini *et al.*	(CLEO Collab.)
BUSKULIC	97C	ZPHY C74 263	D. Buskulic *et al.*	(ALEPH Collab.)
COAN	97	PR D55 7291	T.E. Coan *et al.*	(CLEO Collab.)
EDWARDS	97	PR D55 3919	K.W. Edwards *et al.*	(CLEO Collab.)
EDWARDS	97B	PR D56 5297	K.W. Edwards *et al.*	(CLEO Collab.)
ESCRIBANO	97	PL B395 369	R. Escribano, E. Masso	(BARC, PARIT)
ABREU	96B	PL B365 448	P. Abreu *et al.*	(DELPHI Collab.)
ACCIARRI	96H	PL B377 313	M. Acciarri *et al.*	(L3 Collab.)
ACCIARRI	96K	PL B389 187	M. Acciarri *et al.*	(L3 Collab.)
ALAM	96	PRL 76 2637	M.S. Alam *et al.*	(CLEO Collab.)
ALBRECHT	96E	PRPL 276 223	H. Albrecht *et al.*	(ARGUS Collab.)
ALEXANDER	96D	PL B369 163	G. Alexander *et al.*	(OPAL Collab.)
ALEXANDER	96E	PL B374 341	G. Alexander *et al.*	(OPAL Collab.)
ALEXANDER	96S	PL B388 437	G. Alexander *et al.*	(OPAL Collab.)
BAI	96	PR D53 20	J.Z. Bai *et al.*	(BES Collab.)
BALEST	96	PL B388 402	R. Balest *et al.*	(CLEO Collab.)
BARTELT	96	PRL 76 4119	J.E. Bartelt *et al.*	(CLEO Collab.)
BUSKULIC	96	ZPHY C70 579	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	96C	ZPHY C70 561	D. Buskulic *et al.*	(ALEPH Collab.)
COAN	96	PR D53 6037	T.E. Coan *et al.*	(CLEO Collab.)
ABE	95Y	PR D52 4828	K. Abe *et al.*	(SLD Collab.)
ABREU	95T	PL B357 715	P. Abreu *et al.*	(DELPHI Collab.)
ABREU	95U	PL B359 411	P. Abreu *et al.*	(DELPHI Collab.)
ACCIARRI	95	PL B345 93	M. Acciarri *et al.*	(L3 Collab.)
ACCIARRI	95F	PL B352 487	M. Acciarri *et al.*	(L3 Collab.)
AKERS	95F	ZPHY C66 31	R. Akers *et al.*	(OPAL Collab.)
AKERS	95I	ZPHY C66 543	R. Akers *et al.*	(OPAL Collab.)
AKERS	95P	ZPHY C67 45	R. Akers *et al.*	(OPAL Collab.)
AKERS	95Y	ZPHY C68 555	R. Akers *et al.*	(OPAL Collab.)
ALBRECHT	95	PL B341 441	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	95C	PL B349 576	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	95G	ZPHY C68 25	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	95H	ZPHY C68 215	H. Albrecht *et al.*	(ARGUS Collab.)
BALEST	95C	PRL 75 3809	R. Balest *et al.*	(CLEO Collab.)
BERNABEU	95	NP B436 474	J. Bernabeu *et al.*	
BUSKULIC	95C	PL B346 371	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	95D	PL B346 379	D. Buskulic *et al.*	(ALEPH Collab.)
Also		PL B363 265 (errat.)	D. Buskulic *et al.*	(ALEPH Collab.)
ABREU	94K	PL B334 435	P. Abreu *et al.*	(DELPHI Collab.)
AKERS	94E	PL B328 207	R. Akers *et al.*	(OPAL Collab.)
AKERS	94G	PL B339 278	R. Akers *et al.*	(OPAL Collab.)
ALBRECHT	94E	PL B337 383	H. Albrecht *et al.*	(ARGUS Collab.)
ARTUSO	94	PRL 72 3762	M. Artuso *et al.*	(CLEO Collab.)
BARTELT	94	PRL 73 1890	J.E. Bartelt *et al.*	(CLEO Collab.)
BATTLE	94	PRL 73 1079	M. Battle *et al.*	(CLEO Collab.)
BAUER	94	PR D50 13	D.A. Bauer *et al.*	(TPC/2gamma Collab.)
BUSKULIC	94D	PL B321 168	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	94E	PL B332 209	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	94F	PL B332 219	D. Buskulic *et al.*	(ALEPH Collab.)
GIBAUT	94B	PRL 73 934	D. Gibaut *et al.*	(CLEO Collab.)
ADRIANI	93M	PRPL 236 1	O. Adriani *et al.*	(L3 Collab.)
ALBRECHT	93C	ZPHY C58 61	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	93G	PL B316 608	H. Albrecht *et al.*	(ARGUS Collab.)
BALEST	93	PR D47 3671	R. Balest *et al.*	(CLEO Collab.)
BEAN	93	PRL 70 138	A. Bean *et al.*	(CLEO Collab.)
BORTOLETTO	93	PRL 71 1791	D. Bortoletto *et al.*	(CLEO Collab.)
ESCRIBANO	93	PL B301 419	R. Escribano, E. Masso	(BARC)
PROCARIO	93	PRL 70 1207	M. Procario *et al.*	(CLEO Collab.)
ABREU	92N	ZPHY C55 555	P. Abreu *et al.*	(DELPHI Collab.)
ACTON	92F	PL B281 405	D.P. Acton *et al.*	(OPAL Collab.)
ACTON	92H	PL B288 373	P.D. Acton *et al.*	(OPAL Collab.)
AKERIB	92	PRL 69 3610	D.S. Akerib *et al.*	(CLEO Collab.)
Also		PRL 71 3395 (errat.)	D.S. Akerib *et al.*	(CLEO Collab.)
ALBRECHT	92D	ZPHY C53 367	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	92K	ZPHY C55 179	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	92M	PL B292 221	H. Albrecht *et al.*	(ARGUS Collab.)

ALBRECHT	92Q	ZPHY C56 339	H. Albrecht *et al.*	(ARGUS Collab.)
AMMAR	92	PR D45 3976	R. Ammar *et al.*	(CLEO Collab.)
ARTUSO	92	PRL 69 3278	M. Artuso *et al.*	(CLEO Collab.)
BAI	92	PRL 69 3021	J.Z. Bai *et al.*	(BES Collab.)
BATTLE	92	PL B291 488	M. Battle *et al.*	(CLEO Collab.)
BUSKULIC	92J	PL B297 459	D. Buskulic *et al.*	(ALEPH Collab.)
DECAMP	92C	ZPHY C54 211	D. Decamp *et al.*	(ALEPH Collab.)
ADEVA	91F	PL B265 451	B. Adeva *et al.*	(L3 Collab.)
ALBRECHT	91D	PL B260 259	H. Albrecht *et al.*	(ARGUS Collab.)
ALEXANDER	91D	PL B266 201	G. Alexander *et al.*	(OPAL Collab.)
ANTREASYAN	91	PL B259 216	D. Antreasyan *et al.*	(Crystal Ball Collab.)
GRIFOLS	91	PL B255 611	J.A. Grifols, A. Mendez	(BARC)
ABACHI	90	PR D41 1414	S. Abachi *et al.*	(HRS Collab.)
ALBRECHT	90E	PL B246 278	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	90I	PL B250 164	H. Albrecht *et al.*	(ARGUS Collab.)
BEHREND	90	ZPHY C46 537	H.J. Behrend *et al.*	(CELLO Collab.)
BOWCOCK	90	PR D41 805	T.J.V. Bowcock *et al.*	(CLEO Collab.)
DELAGUILA	90	PL B252 116	F. del Aguila, M. Sher	(BARC, WILL)
GOLDBERG	90	PL B251 223	M. Goldberg *et al.*	(CLEO Collab.)
WU	90	PR D41 2339	D.Y. Wu *et al.*	(Mark II Collab.)
ABACHI	89B	PR D40 902	S. Abachi *et al.*	(HRS Collab.)
BEHREND	89B	PL B222 163	H.J. Behrend *et al.*	(CELLO Collab.)
JANSSEN	89	PL B228 273	H. Janssen *et al.*	(Crystal Ball Collab.)
KLEINWORT	89	ZPHY C42 7	C. Kleinwort *et al.*	(JADE Collab.)
ADEVA	88	PR D38 2665	B. Adeva *et al.*	(Mark-J Collab.)
ALBRECHT	88B	PL B202 149	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	88L	ZPHY C41 1	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	88M	ZPHY C41 405	H. Albrecht *et al.*	(ARGUS Collab.)
AMIDEI	88	PR D37 1750	D. Amidei *et al.*	(Mark II Collab.)
BEHREND	88	PL B200 226	H.J. Behrend *et al.*	(CELLO Collab.)
BRAUNSCH...	88C	ZPHY C39 331	W. Braunschweig *et al.*	(TASSO Collab.)
KEH	88	PL B212 123	S. Keh *et al.*	(Crystal Ball Collab.)
TSCHIRHART	88	PL B205 407	R. Tschirhart *et al.*	(HRS Collab.)
ABACHI	87B	PL B197 291	S. Abachi *et al.*	(HRS Collab.)
ABACHI	87C	PRL 59 2519	S. Abachi *et al.*	(HRS Collab.)
ADLER	87B	PRL 59 1527	J. Adler *et al.*	(Mark III Collab.)
AIHARA	87B	PR D35 1553	H. Aihara *et al.*	(TPC Collab.)
AIHARA	87C	PRL 59 751	H. Aihara *et al.*	(TPC Collab.)
ALBRECHT	87L	PL B185 223	H. Albrecht *et al.*	(ARGUS Collab.)
ALBRECHT	87P	PL B199 580	H. Albrecht *et al.*	(ARGUS Collab.)
BAND	87	PL B198 297	H.R. Band *et al.*	(MAC Collab.)
BAND	87B	PRL 59 415	H.R. Band *et al.*	(MAC Collab.)
BARINGER	87	PRL 59 1993	P. Baringer *et al.*	(CLEO Collab.)
BEBEK	87C	PR D36 690	C. Bebek *et al.*	(CLEO Collab.)
BURCHAT	87	PR D35 27	P.R. Burchat *et al.*	(Mark II Collab.)
BYLSMA	87	PR D35 2269	B.G. Bylsma *et al.*	(HRS Collab.)
COFFMAN	87	PR D36 2185	D.M. Coffman *et al.*	(Mark III Collab.)
DERRICK	87	PL B189 260	M. Derrick *et al.*	(HRS Collab.)
FORD	87	PR D35 408	W.T. Ford *et al.*	(MAC Collab.)
FORD	87B	PR D36 1971	W.T. Ford *et al.*	(MAC Collab.)
GAN	87	PRL 59 411	K.K. Gan *et al.*	(Mark II Collab.)
GAN	87B	PL B197 561	K.K. Gan *et al.*	(Mark II Collab.)
AIHARA	86E	PRL 57 1836	H. Aihara *et al.*	(TPC Collab.)
BARTEL	86D	PL B182 216	W. Bartel *et al.*	(JADE Collab.)
PDG	86	PL 170B 1	M. Aguilar-Benitez *et al.*	(CERN, CIT+)
RUCKSTUHL	86	PRL 56 2132	W. Ruckstuhl *et al.*	(DELCO Collab.)
SCHMIDKE	86	PRL 57 527	W.B. Schmidke *et al.*	(Mark II Collab.)
YELTON	86	PRL 56 812	J.M. Yelton *et al.*	(Mark II Collab.)
ALTHOFF	85	ZPHY C26 521	M. Althoff *et al.*	(TASSO Collab.)
ASH	85B	PRL 55 2118	W.W. Ash *et al.*	(MAC Collab.)
BALTRUSAIT...	85	PRL 55 1842	R.M. Baltrusaitis *et al.*	(Mark III Collab.)
BARTEL	85F	PL 161B 188	W. Bartel *et al.*	(JADE Collab.)
BEHRENDS	85	PR D32 2468	S. Behrends *et al.*	(CLEO Collab.)
BELTRAMI	85	PRL 54 1775	I. Beltrami *et al.*	(HRS Collab.)
BERGER	85	ZPHY C28 1	C. Berger *et al.*	(PLUTO Collab.)
BURCHAT	85	PRL 54 2489	P.R. Burchat *et al.*	(Mark II Collab.)
FERNANDEZ	85	PRL 54 1624	E. Fernandez *et al.*	(MAC Collab.)
MILLS	85	PRL 54 624	G.B. Mills *et al.*	(DELCO Collab.)
AIHARA	84C	PR D30 2436	H. Aihara *et al.*	(TPC Collab.)
BEHREND	84	ZPHY C23 103	H.J. Behrend *et al.*	(CELLO Collab.)
MILLS	84	PRL 52 1944	G.B. Mills *et al.*	(DELCO Collab.)

BEHREND	83C	PL 127B 270	H.J. Behrend *et al.*	(CELLO Collab.)
SILVERMAN	83	PR D27 1196	D.J. Silverman, G.L. Shaw	(UCI)
BEHREND	82	PL 114B 282	H.J. Behrend *et al.*	(CELLO Collab.)
BLOCKER	82B	PRL 48 1586	C.A. Blocker *et al.*	(Mark II Collab.)
BLOCKER	82D	PL 109B 119	C.A. Blocker *et al.*	(Mark II Collab.) J
FELDMAN	82	PRL 48 66	G.J. Feldman *et al.*	(Mark II Collab.)
HAYES	82	PR D25 2869	K.G. Hayes *et al.*	(Mark II Collab.)
BERGER	81B	PL 99B 489	C. Berger *et al.*	(PLUTO Collab.)
DORFAN	81	PRL 46 215	J.M. Dorfan *et al.*	(Mark II Collab.)
BRANDELIK	80	PL 92B 199	R. Brandelik *et al.*	(TASSO Collab.)
ZHOLENTZ	80	PL 96B 214	A.A. Zholents *et al.*	(NOVO)
Also		SJNP 34 814	A.A. Zholents *et al.*	(NOVO)
		Translated from YAF 34 1471.		
BACINO	79B	PRL 42 749	W.J. Bacino *et al.*	(DELCO Collab.)
KIRKBY	79	SLAC-PUB-2419	J. Kirkby	(SLAC) J
Batavia Lepton Photon Conference.				
BACINO	78B	PRL 41 13	W.J. Bacino *et al.*	(DELCO Collab.) J
Also		Tokyo Conf. 249	J. Kirz	(STON)
Also		PL 96B 214	A.A. Zholents *et al.*	(NOVO)
BRANDELIK	78	PL 73B 109	R. Brandelik *et al.*	(DASP Collab.) J
FELDMAN	78	Tokyo Conf. 777	G.J. Feldman	(SLAC) J
JAROS	78	PRL 40 1120	J. Jaros *et al.*	(LGW Collab.)
PERL	75	PRL 35 1489	M.L. Perl *et al.*	(LBL, SLAC)

OTHER RELATED PAPERS

DAVIER	06	RMP 78 1043	M. Davier, A. Hocker, Z. Zhang	(LALO, PARIN+)
RAHAL-CAL...	98	IJMP A13 695	G. Rahal-Callot	(ETH)
GENTILE	96	PRPL 274 287	S. Gentile, M. Pohl	(ROMAI, ETH)
WEINSTEIN	93	ARNPS 43 457	A.J. Weinstein, R. Stroynowski	(CIT, SMU)
PERL	92	RPP 55 653	M.L. Perl	(SLAC)
PICH	90	MPL A5 1995	A. Pich	(VALE)
BARISH	88	PRPL 157 1	B.C. Barish, R. Stroynowski	(CIT)
GAN	88	IJMP A3 531	K.K. Gan, M.L. Perl	(SLAC)
HAYES	88	PR D38 3351	K.G. Hayes, M.L. Perl	(SLAC)
PERL	80	ARNPS 30 299	M.L. Perl	(SLAC)