Λ_b^0

$I(J^P) = 0(\frac{1}{2}^+)$ Status: ∗∗∗

In the quark model, a Λ_b^0 is an isospin-0 $u\,d\,b$ state. The lowest Λ_b^0 ought to have $J^P = 1/2^+$. None of I, J, or P have actually been measured.

Λ_b^0 MASS

$m_{\Lambda_b^0}$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
5619.4 ± 0.7 OUR AVERAGE					
5619.19 ± 0.70 ± 0.30		[1] AAIJ	12E	LHCB	pp at 7 TeV
5619.7 ± 1.2 ± 1.2		[2] ACOSTA	06	CDF	$p\overline{p}$ at 1.96 TeV
5621 ± 4 ± 3		[3] ABE	97B	CDF	$p\overline{p}$ at 1.8 TeV
5668 ± 16 ± 8	4	[4] ABREU	96N	DLPH	$e^+e^- \rightarrow Z$
5614 ± 21 ± 4	4	[4] BUSKULIC	96L	ALEP	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
not seen		[5] ABE	93B	CDF	Sup. by ABE 97B
5640 ± 50 ±30	16	[6] ALBAJAR	91E	UA1	$p\overline{p}$ 630 GeV
5640 $^{+100}_{-210}$	52	BARI	91	SFM	$\Lambda_b^0 \rightarrow pD^0\pi^-$
5650 $^{+150}_{-200}$	90	BARI	91	SFM	$\Lambda_b^0 \rightarrow \Lambda_c^+\pi^+\pi^-\pi^-$

[1] Uses $\Lambda_b^0 \rightarrow J/\psi\Lambda$ fully reconstructed decays.

[2] Uses exclusively reconstructed final states containing a $J/\psi \rightarrow \mu^+\mu^-$ decays.

[3] ABE 97B observed 38 events with a background of 18 ± 1.6 events in the mass range 5.60–5.65 GeV/c^2, a significance of > 3.4 standard deviations.

[4] Uses 4 fully reconstructed Λ_b events.

[5] ABE 93B states that, based on the signal claimed by ALBAJAR 91E, CDF should have found 30 ± 23 $\Lambda_b^0 \rightarrow J/\psi(1S)\Lambda$ events. Instead, CDF found not more than 2 events.

[6] ALBAJAR 91E claims 16 ± 5 events above a background of 9 ± 1 events, a significance of about 5 standard deviations.

$m_{\Lambda_b^0} - m_{B^0}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
339.2±1.4±0.1	[7] ACOSTA	06	CDF	$p\overline{p}$ at 1.96 TeV

[7] Uses exclusively reconstructed final states containing $J/\psi \rightarrow \mu^+\mu^-$ decays.

$m_{\Lambda_b^0} - m_{B^+}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
339.71±0.71±0.09	[8] AAIJ	12E	LHCB	pp at 7 TeV

[8] Uses exclusively reconstructed final states containing $J/\psi \rightarrow \mu^+ \mu^-$ decays.

Λ_b^0 MEAN LIFE

See b-baryon Admixture section for data on b-baryon mean life average over species of b-baryon particles.

"OUR EVALUATION" is an average using rescaled values of the data listed below. The average and rescaling were performed by the Heavy Flavor Averaging Group (HFAG) and are described at http://www.slac.stanford.edu/xorg/hfag/. The averaging/rescaling procedure takes into account correlations between the measurements and asymmetric lifetime errors.

VALUE (10^{-12} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.425±0.032 OUR EVALUATION					
$1.537 \pm 0.045 \pm 0.014$		[9] AALTONEN	11	CDF	$p\overline{p}$ at 1.96 TeV
$1.401 \pm 0.046 \pm 0.035$		[10] AALTONEN	10B	CDF	$p\overline{p}$ at 1.96 TeV
$1.218^{+0.130}_{-0.115} \pm 0.042$		[9] ABAZOV	07S	D0	$p\overline{p}$ at 1.96 TeV
$1.290^{+0.119}_{-0.110}{}^{+0.087}_{-0.091}$		[11] ABAZOV	07U	D0	$p\overline{p}$ at 1.96 TeV
$1.11^{+0.19}_{-0.18} \pm 0.05$		[12] ABREU	99W	DLPH	$e^+ e^- \rightarrow Z$
$1.29^{+0.24}_{-0.22} \pm 0.06$		[12] ACKERSTAFF	98G	OPAL	$e^+ e^- \rightarrow Z$
1.21 ± 0.11		[12] BARATE	98D	ALEP	$e^+ e^- \rightarrow Z$
$1.32 \pm 0.15 \pm 0.07$		[13] ABE	96M	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.593^{+0.083}_{-0.078} \pm 0.033$		[9] ABULENCIA	07A	CDF	Repl. by AALTONEN 11
$1.22^{+0.22}_{-0.18} \pm 0.04$		[9] ABAZOV	05C	D0	Repl. by ABAZOV 07S
$1.19^{+0.21}_{-0.18}{}^{+0.07}_{-0.08}$		ABREU	96D	DLPH	Repl. by ABREU 99W
$1.14^{+0.22}_{-0.19} \pm 0.07$	69	AKERS	95K	OPAL	Repl. by ACKERSTAFF 98G
$1.02^{+0.23}_{-0.18} \pm 0.06$	44	BUSKULIC	95L	ALEP	Repl. by BARATE 98D

[9] Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow J/\psi \Lambda$ decays.

[10] Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^-$ decays.

[11] Measured using semileptonic decays $\Lambda_b^0 \rightarrow \Lambda_c^+ \mu \nu X$ and $\Lambda_c^+ \rightarrow K_S^0 p$.

[12] Measured using $\Lambda_c \ell^-$ and $\Lambda \ell^+ \ell^-$.

[13] Excess $\Lambda_c \ell^-$, decay lengths.

$\tau_{\Lambda_b^0}/\tau_{B^0}$ MEAN LIFE RATIO

$\tau_{\Lambda_b^0}/\tau_{B^0}$ (direct measurements)

VALUE	DOCUMENT ID	TECN	COMMENT
1.00 ±0.06 OUR AVERAGE	Error includes scale factor of 2.0.		
$1.020 \pm 0.030 \pm 0.008$	[14] AALTONEN 11	CDF	$p\overline{p}$ at 1.96 TeV
$0.811^{+0.096}_{-0.087} \pm 0.034$	[14,15] ABAZOV 07S	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1.041 ± 0.057	[16] ABULENCIA 07A	CDF	Repl. by AALTONEN 11
$0.87 \ ^{+0.17}_{-0.14} \pm 0.03$	[16] ABAZOV 05C	D0	Repl. by ABAZOV 07S

[14] Uses fully reconstructed $\Lambda_b \rightarrow J/\psi \Lambda$ decays.
[15] Uses $B^0 \rightarrow J/\psi K_S^0$ decays for denominator.
[16] Measured mean life ratio using fully reconstructed decays.

Λ_b^0 DECAY MODES

The branching fractions B(b-baryon $\rightarrow \Lambda \ell^- \overline{\nu}_\ell$ anything) and B($\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \overline{\nu}_\ell$ anything) are not pure measurements because the underlying measured products of these with B($b \rightarrow b$-baryon) were used to determine B($b \rightarrow b$-baryon), as described in the note "Production and Decay of b-Flavored Hadrons."

For inclusive branching fractions, *e.g.*, $\Lambda_b \rightarrow \overline{\Lambda}_c$ anything, the values usually are multiplicities, not branching fractions. They can be greater than one.

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$J/\psi(1S)\Lambda \times$ B($b \rightarrow \Lambda_b^0$)	$(5.8 \pm 0.8) \times 10^{-5}$	
Γ_2	$p D^0 \pi^-$		
Γ_3	$\Lambda_c^+ \pi^-$	$(5.7^{+4.0}_{-2.6}) \times 10^{-3}$	S=1.6
Γ_4	$\Lambda_c^+ a_1(1260)^-$	seen	
Γ_5	$\Lambda_c^+ \pi^+ \pi^- \pi^-$	$(8 \ ^{+5}_{-4}) \times 10^{-3}$	S=1.6
Γ_6	$\Lambda_c(2595)^+ \pi^-$, $\Lambda_c(2595)^+ \rightarrow \Lambda_c^+ \pi^+ \pi^-$	$(3.7^{+2.8}_{-2.3}) \times 10^{-4}$	
Γ_7	$\Lambda_c(2625)^+ \pi^-$, $\Lambda_c(2625)^+ \rightarrow \Lambda_c^+ \pi^+ \pi^-$	$(3.6^{+2.7}_{-2.1}) \times 10^{-4}$	
Γ_8	$\Sigma_c(2455)^0 \pi^+ \pi^-$, $\Sigma_c^0 \rightarrow \Lambda_c^+ \pi^-$	$(6 \ ^{+5}_{-4}) \times 10^{-4}$	
Γ_9	$\Sigma_c(2455)^{++} \pi^- \pi^-$, $\Sigma_c^{++} \rightarrow \Lambda_c^+ \pi^+$	$(3.5^{+2.8}_{-2.3}) \times 10^{-4}$	
Γ_{10}	$\Lambda K^0 2\pi^+ 2\pi^-$		

Γ_{11}	$\Lambda_c^+ \ell^- \overline{\nu}_\ell$ anything	[a]	(9.8 ± 2.3) %	
Γ_{12}	$\Lambda_c^+ \ell^- \overline{\nu}_\ell$		$(6.5^{+3.2}_{-2.5})$ %	S=1.8
Γ_{13}	$\Lambda_c^+ \pi^+ \pi^- \ell^- \overline{\nu}_\ell$		(5.6 ± 3.1) %	
Γ_{14}	$\Lambda_c(2595)^+ \ell^- \overline{\nu}_\ell$		$(8 \pm 5) \times 10^{-3}$	
Γ_{15}	$\Lambda_c(2625)^+ \ell^- \overline{\nu}_\ell$		$(1.4^{+0.9}_{-0.7})$ %	
Γ_{16}	$\Sigma_c(2455)^0 \pi^+ \ell^- \overline{\nu}_\ell$			
Γ_{17}	$\Sigma_c(2455)^{++} \pi^- \ell^- \overline{\nu}_\ell$			
Γ_{18}	$p h^-$	[b]	$< 2.3 \times 10^{-5}$	CL=90%
Γ_{19}	$p \pi^-$		$(3.5 \pm 1.0) \times 10^{-6}$	
Γ_{20}	$p K^-$		$(5.5 \pm 1.4) \times 10^{-6}$	
Γ_{21}	$\Lambda \mu^+ \mu^-$		$(1.7 \pm 0.7) \times 10^{-6}$	
Γ_{22}	$\Lambda \gamma$		$< 1.3 \times 10^{-3}$	CL=90%

[a] Not a pure measurement. See note at head of Λ_b^0 Decay Modes.

[b] Here h^- means π^- or K^-.

CONSTRAINED FIT INFORMATION

An overall fit to 5 branching ratios uses 5 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 =$ 3.9 for 2 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	93	
x_{12}	14	13
	x_3	x_5

Λ_b^0 BRANCHING RATIOS

$\Gamma(J/\psi(1S)\Lambda \times \text{B}(b \to \Lambda_b^0))/\Gamma_{\text{total}}$ — Γ_1/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
5.8 ± 0.8 OUR AVERAGE					
6.01 ± 0.60 ± 0.58 ± 0.28		[17] ABAZOV	11O	D0	$p\overline{p}$ at 1.96 TeV
4.7 ± 2.3 ± 0.2		[18] ABE	97B	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
180 ±60 ±90	16	ALBAJAR	91E	UA1	$p\overline{p}$ at 630 GeV

[17] ABAZOV 11O uses B($B^0 \to J/\psi K^0_S$) × B($b \to B^0$) = (1.74 ± 0.08) × 10^{-4} to obtain the result. The (±0.08) × 10^{-4} uncertainty of this product is listed as the last uncertainty of the measurement, (±0.28) × 10^{-5}.

[18] ABE 97B reports [B($\Lambda^0_b \to J/\psi \Lambda$) × B($b \to \Lambda^0_b$)] / [B($B^0 \to J/\psi K^0_S$) × B($b \to B^0$)] = 0.27 ± 0.12 ± 0.05. We multiply by our best value B($B^0 \to J/\psi K^0_S$) × B($b \to B^0$) = (1.74 ± 0.08) × 10^{-4}. Our first error is their experiment error and our second error is the systematic error from using our best value.

$\Gamma(p D^0 \pi^-)/\Gamma_{total}$ — Γ_2/Γ

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	52	BARI	91	SFM	$D^0 \to K^- \pi^+$
seen		BASILE	81	SFM	$D^0 \to K^- \pi^+$

$\Gamma(\Lambda_c^+ \pi^-)/\Gamma_{total}$ — Γ_3/Γ

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$5.7^{+4.0}_{-2.6}$ OUR FIT Error includes scale factor of 1.6.					
8.8±2.8±1.5		[19] ABULENCIA	07B	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	3	ABREU	96N	DLPH	$\Lambda_c^+ \to p K^- \pi^+$
seen	4	BUSKULIC	96L	ALEP	$\Lambda_c^+ \to p K^- \pi^+$, $p \overline{K}^0$, $\Lambda \pi^+ \pi^+ \pi^-$

[19] The result is obtained from ($f_{\rm baryon}/f_{\rm d}$) (B($\Lambda^0_b \to \Lambda_c^+ \pi^-$)/B($\overline{B}^0 \to D^+ \pi^-$)) = 0.82 ± 0.08 ± 0.11 ± 0.22, assuming $f_{\rm baryon}/f_{\rm d}$ = 0.25 ± 0.04 and B($\overline{B}^0 \to D^+ \pi^-$) = (2.68 ± 0.13) × 10^{-3}.

$\Gamma(\Lambda_c^+ a_1(1260)^-)/\Gamma_{total}$ — Γ_4/Γ

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
seen	1	ABREU	96N	DLPH	$\Lambda_c^+ \to p K^- \pi^+$, $a_1^- \to \rho^0 \pi^- \to \pi^+ \pi^- \pi^-$

$\Gamma(\Lambda_c^+ \pi^+ \pi^- \pi^-)/\Gamma_{total}$ — Γ_5/Γ

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
8^{+5}_{-4} OUR FIT Error includes scale factor of 1.6.					
$17 \pm 4^{+11}_{-8}$		[20] AALTONEN	12A	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	90	BARI	91	SFM	$\Lambda_c^+ \to p K^- \pi^+$

[20] AALTONEN 12A reports [$\Gamma(\Lambda^0_b \to \Lambda_c^+ \pi^+ \pi^- \pi^-)/\Gamma_{\rm total}$] / [B($\Lambda^0_b \to \Lambda_c^+ \pi^-$)] = $3.04 \pm 0.33^{+0.70}_{-0.55}$ which we multiply by our best value B($\Lambda^0_b \to \Lambda_c^+ \pi^-$) = $(5.7^{+4.0}_{-2.6}) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Lambda_c^+\pi^+\pi^-\pi^-)/\Gamma(\Lambda_c^+\pi^-)$ — Γ_5/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
1.46±0.22 OUR FIT Error includes scale factor of 1.1.				
1.43±0.16±0.13	AAIJ	11E	LHCB	pp at 7 TeV

$\Gamma(\Lambda_c(2595)^+\pi^-, \Lambda_c(2595)^+ \to \Lambda_c^+\pi^+\pi^-)/\Gamma(\Lambda_c^+\pi^+\pi^-\pi^-)$ — Γ_6/Γ_5

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$\mathbf{4.4\pm1.7^{+0.6}_{-0.4}}$	AAIJ	11E	LHCB	pp at 7 TeV

$\Gamma(\Lambda_c(2625)^+\pi^-, \Lambda_c(2625)^+ \to \Lambda_c^+\pi^+\pi^-)/\Gamma(\Lambda_c^+\pi^+\pi^-\pi^-)$ — Γ_7/Γ_5

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
4.3±1.5±0.4	AAIJ	11E	LHCB	pp at 7 TeV

$\Gamma(\Sigma_c(2455)^0\pi^+\pi^-, \Sigma_c^0 \to \Lambda_c^+\pi^-)/\Gamma(\Lambda_c^+\pi^+\pi^-\pi^-)$ — Γ_8/Γ_5

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
7.4±2.4±1.2	AAIJ	11E	LHCB	pp at 7 TeV

$\Gamma(\Sigma_c(2455)^{++}\pi^-\pi^-, \Sigma_c^{++} \to \Lambda_c^+\pi^+)/\Gamma(\Lambda_c^+\pi^+\pi^-\pi^-)$ — Γ_9/Γ_5

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
4.2±1.8±0.7	AAIJ	11E	LHCB	pp at 7 TeV

$\Gamma(\Lambda K^0 2\pi^+ 2\pi^-)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	4	[21] ARENTON	86	FMPS	$\Lambda K_S^0 2\pi^+ 2\pi^-$

[21] See the footnote to the ARENTON 86 mass value.

$\Gamma(\Lambda_c^+\ell^-\overline{\nu}_\ell \text{anything})/\Gamma_{total}$ — Γ_{11}/Γ

The values and averages in this section serve only to show what values result if one assumes our B($b \to b$-baryon). They cannot be thought of as measurements since the underlying product branching fractions were also used to determine B($b \to b$-baryon) as described in the note on "Production and Decay of b-Flavored Hadrons."

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.098±0.023 OUR AVERAGE					
0.092±0.017±0.016		[22] BARATE	98D	ALEP	$e^+e^- \to Z$
0.13 ±0.04 ±0.02	29	[23] ABREU	95S	DLPH	$e^+e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.081±0.020±0.014	55	[24] BUSKULIC	95L	ALEP	Repl. by BARATE 98D
0.16 ±0.06 ±0.03	21	[25] BUSKULIC	92E	ALEP	$\Lambda_c^+ \to pK^-\pi^+$

[22] BARATE 98D reports $[\Gamma(\Lambda_b^0 \to \Lambda_c^+\ell^-\overline{\nu}_\ell \text{anything})/\Gamma_{total}] \times [B(\overline{b} \to b\text{-baryon})] = 0.0086 \pm 0.0007 \pm 0.0014$ which we divide by our best value $B(\overline{b} \to b\text{-baryon}) = (9.3 \pm 1.6) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Measured using $\Lambda_c\ell^-$ and $\Lambda\ell^+\ell^-$.

[23] ABREU 95S reports $[\Gamma(\Lambda_b^0 \to \Lambda_c^+\ell^-\overline{\nu}_\ell \text{anything})/\Gamma_{total}] \times [B(\overline{b} \to b\text{-baryon})] = 0.0118 \pm 0.0026^{+0.0031}_{-0.0021}$ which we divide by our best value $B(\overline{b} \to b\text{-baryon}) = (9.3 \pm$

1.6) $\times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[24] BUSKULIC 95L reports $[\Gamma(\Lambda_b^0 \to \Lambda_c^+ \ell^- \overline{\nu}_\ell \text{anything})/\Gamma_{\text{total}}] \times [B(\overline{b} \to b\text{-baryon})] = 0.00755 \pm 0.0014 \pm 0.0012$ which we divide by our best value $B(\overline{b} \to b\text{-baryon}) = (9.3 \pm 1.6) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[25] BUSKULIC 92E reports $[\Gamma(\Lambda_b^0 \to \Lambda_c^+ \ell^- \overline{\nu}_\ell \text{anything})/\Gamma_{\text{total}}] \times [B(\overline{b} \to b\text{-baryon})] = 0.015 \pm 0.0035 \pm 0.0045$ which we divide by our best value $B(\overline{b} \to b\text{-baryon}) = (9.3 \pm 1.6) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Superseded by BUSKULIC 95L.

$\Gamma(\Lambda_c^+ \ell^- \overline{\nu}_\ell)/\Gamma_{\text{total}}$ — Γ_{12}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.065^{+0.032}_{-0.025}$ OUR FIT Error includes scale factor of 1.8.				
$0.050^{+0.011}_{-0.008}{}^{+0.016}_{-0.012}$	[26] ABDALLAH	04A	DLPH	$e^+ e^- \to Z^0$

[26] Derived from a combined likelihood and event rate fit to the distribution of the Isgur-Wise variable and using HQET. The slope of the form factor is measured to be $\rho^2 = 2.03 \pm 0.46^{+0.72}_{-1.00}$.

$\Gamma(\Lambda_c^+ \ell^- \overline{\nu}_\ell)/\Gamma(\Lambda_c^+ \pi^-)$ — Γ_{12}/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
$11\ ^{+4}_{-5}$ OUR FIT Error includes scale factor of 1.2.				
$16.6 \pm 3.0^{+2.8}_{-3.6}$	AALTONEN	09E	CDF	$p\overline{p}$ at 1.96 TeV

$\Gamma(\Lambda_c^+ \pi^+ \pi^- \ell^- \overline{\nu}_\ell)/\Gamma_{\text{total}}$ — Γ_{13}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$0.056^{+0.031}_{-0.030}$	[27] ABDALLAH	04A	DLPH	$e^+ e^- \to Z^0$

[27] Derived from the fraction of $\Gamma(\Lambda_b^0 \to \Lambda_c^+ \ell^- \overline{\nu}_\ell)$ / ($\Gamma(\Lambda_b^0 \to \Lambda_c^+ \ell^- \overline{\nu}_\ell) + \Gamma(\Lambda_b^0 \to \Lambda_c^+ \pi^+ \pi^- \ell^- \overline{\nu}_\ell)$) $= 0.47^{+0.10}_{-0.08}{}^{+0.07}_{-0.06}$.

$\Gamma(\Lambda_c^+ \ell^- \overline{\nu}_\ell)/[\Gamma(\Lambda_c^+ \ell^- \overline{\nu}_\ell) + \Gamma(\Lambda_c^+ \pi^+ \pi^- \ell^- \overline{\nu}_\ell)]$ — $\Gamma_{12}/(\Gamma_{12}+\Gamma_{13})$

VALUE	DOCUMENT ID		TECN	COMMENT
$0.47^{+0.10}_{-0.08}{}^{+0.07}_{-0.06}$	ABDALLAH	04A	DLPH	$e^+ e^- \to Z^0$

$\Gamma(\Lambda_c(2595)^+ \ell^- \overline{\nu}_\ell)/\Gamma(\Lambda_c^+ \ell^- \overline{\nu}_\ell)$ — Γ_{14}/Γ_{12}

VALUE	DOCUMENT ID		TECN	COMMENT
$0.126 \pm 0.033^{+0.047}_{-0.038}$	AALTONEN	09E	CDF	$p\overline{p}$ at 1.96 TeV

$\Gamma(\Lambda_c(2625)^+ \ell^- \overline{\nu}_\ell)/\Gamma(\Lambda_c^+ \ell^- \overline{\nu}_\ell)$ — Γ_{15}/Γ_{12}

VALUE	DOCUMENT ID		TECN	COMMENT
$0.210 \pm 0.042^{+0.071}_{-0.050}$	AALTONEN	09E	CDF	$p\overline{p}$ at 1.96 TeV

$\left[\frac{1}{2}\Gamma\left(\Sigma_c(2455)^0\pi^+\ell^-\overline{\nu}_\ell\right)+\frac{1}{2}\Gamma\left(\Sigma_c(2455)^{++}\pi^-\ell^-\overline{\nu}_\ell\right)\right]/\Gamma\left(\Lambda_c^+\ell^-\overline{\nu}_\ell\right)$ $\left(\frac{1}{2}\Gamma_{16}+\frac{1}{2}\Gamma_{17}\right)/\Gamma_{12}$

VALUE	DOCUMENT ID		TECN	COMMENT
$0.054\pm0.022^{+0.021}_{-0.018}$	AALTONEN	09E	CDF	$p\overline{p}$ at 1.96 TeV

$\Gamma\left(p h^-\right)/\Gamma_{\text{total}}$ Γ_{18}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.3\times10^{-5}$	90	[28] ACOSTA	05O	CDF	$p\overline{p}$ at 1.96 TeV

[28] Assumes f_Λ / f_d = 0.25, and equal momentum distribution for Λ_b and B mesons.

$\Gamma\left(p\pi^-\right)/\Gamma_{\text{total}}$ Γ_{19}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
3.5±0.8±0.6		[29] AALTONEN	09C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<50	90	[30] BUSKULIC	96V	ALEP	$e^+e^-\to Z$

[29] AALTONEN 09C reports $[\Gamma(\Lambda_b^0\to p\pi^-)/\Gamma_{\text{total}}]$ / $[B(B^0\to K^+\pi^-)]\times[B(\overline{b}\to b\text{-baryon})]$ / $[B(\overline{b}\to B^0)]$ = 0.042 ± 0.007 ± 0.006 which we multiply or divide by our best values $B(B^0\to K^+\pi^-) = (1.94\pm0.06)\times10^{-5}$, $B(\overline{b}\to b\text{-baryon}) = (9.3\pm1.6)\times10^{-2}$, $B(\overline{b}\to B^0) = (40.1\pm0.8)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[30] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

$\Gamma\left(pK^-\right)/\Gamma_{\text{total}}$ Γ_{20}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
5.5±1.0±1.0		[31] AALTONEN	09C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<360	90	[32] ADAM	96D	DLPH	$e^+e^-\to Z$
< 50	90	[33] BUSKULIC	96V	ALEP	$e^+e^-\to Z$

[31] AALTONEN 09C reports $[\Gamma(\Lambda_b^0\to pK^-)/\Gamma_{\text{total}}]$ / $[B(B^0\to K^+\pi^-)]\times[B(\overline{b}\to b\text{-baryon})]$ / $[B(\overline{b}\to B^0)]$ = 0.066 ± 0.009 ± 0.008 which we multiply or divide by our best values $B(B^0\to K^+\pi^-) = (1.94\pm0.06)\times10^{-5}$, $B(\overline{b}\to b\text{-baryon}) = (9.3\pm1.6)\times10^{-2}$, $B(\overline{b}\to B^0) = (40.1\pm0.8)\times10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[32] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

[33] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

$\Gamma\left(\Lambda\mu^+\mu^-\right)/\Gamma_{\text{total}}$ Γ_{21}/Γ

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
17.3±4.2±5.5	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

$\Gamma\left(\Lambda\gamma\right)/\Gamma_{\text{total}}$ Γ_{22}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.3\times10^{-3}$	90	ACOSTA	02G	CDF	$p\overline{p}$ at 1.8 TeV

PARTIAL BRANCHING FRACTIONS IN $\Lambda_b \to \Lambda\mu^+\mu^-$

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($q^2 < 2.0$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.15±2.01±0.05	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($2.0 < q^2 < 4.3$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.8±1.7±0.6	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($4.3 < q^2 < 8.68$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.2±1.6±0.1	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($10.09 < q^2 < 12.86$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
3.0±1.5±1.0	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($14.18 < q^2 < 16.0$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.0±0.7±0.3	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($16.0 < q^2$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
7.0±1.9±2.2	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($1.0 < q^2 < 6.0$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
1.3±2.1±0.4	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

B($\Lambda_b \to \Lambda\mu^+\mu^-$) ($0.0 < q^2 < 4.3$ GeV^2/c^2)

VALUE (units 10^{-7})	*DOCUMENT ID*		*TECN*	*COMMENT*
2.7±2.5±0.9	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

CP VIOLATION

A_{CP} is defined as

$$A_{CP} = \frac{B(\Lambda_b^0 \to f) - B(\overline{\Lambda}_b^0 \to \overline{f})}{B(\Lambda_b^0 \to f) + B(\overline{\Lambda}_b^0 \to \overline{f})},$$

the *CP*-violation asymmetry of exclusive Λ_b^0 and $\overline{\Lambda}_b^0$ decay.

$A_{CP}(\Lambda_b \to p\pi^-)$

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.03±0.17±0.05	AALTONEN	11N	CDF	$p\overline{p}$ at 1.96 TeV

$A_{CP}(\Lambda_b \rightarrow \ pK^-)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.37±0.17±0.03	AALTONEN	11N	CDF	$p\overline{p}$ at 1.96 TeV

Λ_b^0 REFERENCES

AAIJ	12E	PL B708 241	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	12A	PR D85 032003	T. Aaltonen *et al.*	(CDF Collab.)
AAIJ	11E	PR D84 092001	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	11	PRL 106 121804	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	11O	PR D84 031102	V.M. Abazov *et al.*	(D0 Collab.)
AALTONEN	10B	PRL 104 102002	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	09E	PR D79 032001	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	07S	PRL 99 142001	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	07U	PRL 99 182001	V.M. Abazov *et al.*	(D0 Collab.)
ABULENCIA	07A	PRL 98 122001	A. Abulencia *et al.*	(FNAL CDF Collab.)
ABULENCIA	07B	PRL 98 122002	A. Abulencia *et al.*	(FNAL CDF Collab.)
ACOSTA	06	PRL 96 202001	D. Acosta *et al.*	(CDF Collab.)
ABAZOV	05C	PRL 94 102001	V.M. Abazov *et al.*	(D0 Collab.)
ACOSTA	05O	PR D72 051104R	D. Acosta *et al.*	(CDF Collab.)
ABDALLAH	04A	PL B585 63	J. Abdallah *et al.*	(DELPHI Collab.)
ACOSTA	02G	PR D66 112002	D. Acosta *et al.*	(CDF Collab.)
ABREU	99W	EPJ C10 185	P. Abreu *et al.*	(DELPHI Collab.)
ACKERSTAFF	98G	PL B426 161	K. Ackerstaff *et al.*	(OPAL Collab.)
BARATE	98D	EPJ C2 197	R. Barate *et al.*	(ALEPH Collab.)
ABE	97B	PR D55 1142	F. Abe *et al.*	(CDF Collab.)
ABE	96M	PRL 77 1439	F. Abe *et al.*	(CDF Collab.)
ABREU	96D	ZPHY C71 199	P. Abreu *et al.*	(DELPHI Collab.)
ABREU	96N	PL B374 351	P. Abreu *et al.*	(DELPHI Collab.)
ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)
BUSKULIC	96L	PL B380 442	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	96V	PL B384 471	D. Buskulic *et al.*	(ALEPH Collab.)
PDG	96	PR D54 1	R. M. Barnett *et al.*	
ABREU	95S	ZPHY C68 375	P. Abreu *et al.*	(DELPHI Collab.)
AKERS	95K	PL B353 402	R. Akers *et al.*	(OPAL Collab.)
BUSKULIC	95L	PL B357 685	D. Buskulic *et al.*	(ALEPH Collab.)
ABE	93B	PR D47 R2639	F. Abe *et al.*	(CDF Collab.)
BUSKULIC	92E	PL B294 145	D. Buskulic *et al.*	(ALEPH Collab.)
ALBAJAR	91E	PL B273 540	C. Albajar *et al.*	(UA1 Collab.)
BARI	91	NC 104A 1787	G. Bari *et al.*	(CERN R422 Collab.)
ARENTON	86	NP B274 707	M.W. Arenton *et al.*	(ARIZ, NDAM, VAND)
BASILE	81	LNC 31 97	M. Basile *et al.*	(CERN R415 Collab.)