



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

In the quark model, a Λ_b^0 is an isospin-0 udb 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

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
5620.2 ± 1.6	OUR AVERAGE			
5619.7 ± 1.2 ± 1.2		¹ ACOSTA 06	CDF	$p\bar{p}$ at 1.96 TeV
5621 ± 4 ± 3		² ABE 97B	CDF	$p\bar{p}$ at 1.8 TeV
5668 ± 16 ± 8	4	³ ABREU 96N	DLPH	$e^+e^- \rightarrow Z$
5614 ± 21 ± 4	4	³ BUSKULIC 96L	ALEP	$e^+e^- \rightarrow Z$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
not seen		⁴ ABE 93B	CDF	Sup. by ABE 97B
5640 ± 50 ± 30	16	⁵ ALBAJAR 91E	UA1	$p\bar{p}$ 630 GeV
5640 $\begin{smallmatrix} +100 \\ -210 \end{smallmatrix}$	52	BARI 91	SFM	$\Lambda_b^0 \rightarrow pD^0\pi^-$
5650 $\begin{smallmatrix} +150 \\ -200 \end{smallmatrix}$	90	BARI 91	SFM	$\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^+ \pi^- \pi^-$

- ¹ Uses exclusively reconstructed final states containing a $J/\psi \rightarrow \mu^+ \mu^-$ decays.
- ² 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.
- ³ Uses 4 fully reconstructed Λ_b events.
- ⁴ ABE 93B states that, based on the signal claimed by ALBAJAR 91E, CDF should have found $30 \pm 23 \Lambda_b^0 \rightarrow J/\psi(1S)\Lambda$ events. Instead, CDF found not more than 2 events.
- ⁵ ALBAJAR 91E claims 16 ± 5 events above a background of 9 ± 1 events, a significance of about 5 standard deviations.

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
339.2 ± 1.4 ± 0.1	⁶ ACOSTA 06	CDF	$p\bar{p}$ at 1.96 TeV

- ⁶ Uses exclusively reconstructed final states containing a $J/\psi \rightarrow \mu^+ \mu^-$ 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.

<u>VALUE</u> (10^{-12} s)	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.383^{+0.049}_{-0.048} OUR EVALUATION				
1.218 ^{+0.130} _{-0.115} ± 0.042		⁷ ABAZOV	07S D0	$\rho\bar{p}$ at 1.96 TeV
1.290 ^{+0.119} _{-0.110} ± 0.087		⁸ ABAZOV	07U D0	$\rho\bar{p}$ at 1.96 TeV
1.593 ^{+0.083} _{-0.078} ± 0.033		⁷ ABULENCIA	07A CDF	$\rho\bar{p}$ at 1.96 TeV
1.11 ^{+0.19} _{-0.18} ± 0.05		⁹ ABREU	99W DLPH	$e^+e^- \rightarrow Z$
1.29 ^{+0.24} _{-0.22} ± 0.06		⁹ ACKERSTAFF	98G OPAL	$e^+e^- \rightarrow Z$
1.21 ± 0.11		⁹ BARATE	98D ALEP	$e^+e^- \rightarrow Z$
1.32 ± 0.15 ± 0.07		¹⁰ ABE	96M CDF	$\rho\bar{p}$ at 1.8 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1.22 ^{+0.22} _{-0.18} ± 0.04		⁷ ABAZOV	05C D0	Repl. by ABAZOV 07S
1.19 ^{+0.21} _{-0.18} ± 0.07		ABREU	96D DLPH	Repl. by ABREU 99W
1.14 ^{+0.22} _{-0.19} ± 0.07	69	AKERS	95K OPAL	Repl. by ACKERSTAFF 98G
1.02 ^{+0.23} _{-0.18} ± 0.06	44	BUSKULIC	95L ALEP	Repl. by BARATE 98D
⁷ Measured mean life using fully reconstructed $\Lambda_b^0 \rightarrow J/\psi \Lambda$ decays.				
⁸ Measured using semileptonic decays $\Lambda_b^0 \rightarrow \Lambda_c^+ \mu \nu X$ and $\Lambda_c^+ \rightarrow K_S^0 p$.				
⁹ Measured using $\Lambda_c \ell^-$ and $\Lambda \ell^+ \ell^-$.				
¹⁰ 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)

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.99 ± 0.10 OUR AVERAGE Error includes scale factor of 2.0.			
0.811 ^{+0.096} _{-0.087} ± 0.034	^{11,12} ABAZOV	07S D0	$\rho\bar{p}$ at 1.96 TeV
1.041 ± 0.057	¹³ ABULENCIA	07A CDF	$\rho\bar{p}$ at 1.96 TeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.87 ^{+0.17} _{-0.14} ± 0.03	¹³ ABAZOV	05C D0	Repl. by ABAZOV 07S
¹¹ Uses fully reconstructed $\Lambda_b \rightarrow J/\psi \Lambda$ decays.			
¹² Uses $B^0 \rightarrow J/\psi K_S^0$ decays for denominator.			
¹³ Measured mean life ratio using fully reconstructed decays.			

Λ_b^0 DECAY MODES

These branching fractions are actually an average over weakly decaying b -baryons weighted by their production rates in Z decay (or high-energy $p\bar{p}$), branching ratios, and detection efficiencies. They scale with the LEP b -baryon production fraction $B(b \rightarrow b\text{-baryon})$ and are evaluated for our value $B(b \rightarrow b\text{-baryon}) = (9.2 \pm 1.8)\%$.

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

For inclusive branching fractions, *e.g.*, $B \rightarrow D^\pm \text{ anything}$, the values usually are multiplicities, not branching fractions. They can be greater than one.

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 $J/\psi(1S)\Lambda \times B(b \rightarrow \Lambda_b^0)$	$(4.7 \pm 2.3) \times 10^{-5}$	
Γ_2 $\rho D^0 \pi^-$		
Γ_3 $\Lambda_c^+ \pi^-$	$(8.8 \pm 3.2) \times 10^{-3}$	
Γ_4 $\Lambda_c^+ a_1(1260)^-$	seen	
Γ_5 $\Lambda_c^+ \pi^+ \pi^- \pi^-$		
Γ_6 $\Lambda K^0 2\pi^+ 2\pi^-$		
Γ_7 $\Lambda_c^+ \ell^- \bar{\nu}_\ell \text{ anything}$	[a] $(10.6 \pm 3.1) \%$	
Γ_8 $\Lambda_c^+ \ell^- \bar{\nu}_\ell$	$(5.0^{+1.9}_{-1.4}) \%$	
Γ_9 $\Lambda_c^+ \pi^+ \pi^- \ell^- \bar{\nu}_\ell$	$(5.6 \pm 3.1) \%$	
Γ_{10} $\Lambda_c(2595)^+ \ell^- \bar{\nu}_\ell$	$(6.3^{+4.0}_{-3.1}) \times 10^{-3}$	
Γ_{11} $\Lambda_c(2625)^+ \ell^- \bar{\nu}_\ell$	$(1.1^{+0.6}_{-0.4}) \%$	
Γ_{12} $\Sigma_c(2455)^0 \pi^+ \ell^- \bar{\nu}_\ell$		
Γ_{13} $\Sigma_c(2455)^{++} \pi^- \ell^- \bar{\nu}_\ell$		
Γ_{14} ρh^-	[b] $< 2.3 \times 10^{-5}$	90%
Γ_{15} $\rho \pi^-$	$< 5.0 \times 10^{-5}$	90%
Γ_{16} ρK^-	$< 5.0 \times 10^{-5}$	90%
Γ_{17} $\Lambda \gamma$	$< 1.3 \times 10^{-3}$	90%

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

[b] Here h^- means π^- or K^- .

Λ_b^0 BRANCHING RATIOS

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

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$0.47 \pm 0.23 \pm 0.02$		14 ABE	97B CDF	$p\bar{p}$ at 1.8 TeV

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

18 ± 6 ± 9 16 ALBAJAR 91E UA1 $p\bar{p}$ at 630 GeV

¹⁴ ABE 97B reports $[B(\Lambda_b^0 \rightarrow J/\psi\Lambda) \times B(b \rightarrow \Lambda_b^0)] / [B(B^0 \rightarrow J/\psi K_S^0) \times B(b \rightarrow B^0)] = 0.27 \pm 0.12 \pm 0.05$. We multiply by our best value $B(B^0 \rightarrow J/\psi K_S^0) \times B(b \rightarrow B^0) = (1.74 \pm 0.08) \times 10^{-4}$. Our first error is their experiments's error and our second error is the systematic error from using our best value.

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	52	BARI	91 SFM	$D^0 \rightarrow K^- \pi^+$
seen		BASILE	81 SFM	$D^0 \rightarrow K^- \pi^+$

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

<u>VALUE (units 10^{-3})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$8.8 \pm 2.8 \pm 1.5$		15 ABULENCIA	07B CDF	$p\bar{p}$ at 1.96 TeV

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

seen 3 ABREU 96N DLPH $\Lambda_c^+ \rightarrow p K^- \pi^+$
 seen 4 BUSKULIC 96L ALEP $\Lambda_c^+ \rightarrow p K^- \pi^+$,
 $\rho \bar{K}^0, \Lambda \pi^+ \pi^+ \pi^-$

¹⁵ The result is obtained from $(f_{\text{baryon}}/f_d) (B(\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^-)/B(\bar{B}^0 \rightarrow D^+ \pi^-)) = 0.82 \pm 0.08 \pm 0.11 \pm 0.22$, assuming $f_{\text{baryon}}/f_d = 0.25 \pm 0.04$ and $B(\bar{B}^0 \rightarrow D^+ \pi^-) = (2.68 \pm 0.13) \times 10^{-3}$.

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	1	ABREU	96N DLPH	$\Lambda_c^+ \rightarrow p K^- \pi^+, a_1^- \rightarrow \rho^0 \pi^- \rightarrow \pi^+ \pi^- \pi^-$

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	90	BARI	91 SFM	$\Lambda_c^+ \rightarrow p K^- \pi^+$

$\Gamma(\Lambda K^0 2\pi^+ 2\pi^-)/\Gamma_{\text{total}}$ Γ_6/Γ

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
seen	4	¹⁶ ARENTON	86 FMPS	$\Lambda K_S^0 2\pi^+ 2\pi^-$

¹⁶ See the footnote to the ARENTON 86 mass value.

$\Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell \text{ anything})/\Gamma_{\text{total}}$ Γ_7/Γ

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.106 ± 0.031 OUR AVERAGE

0.100 ± 0.018 ± 0.024 17 BARATE 98D ALEP $e^+ e^- \rightarrow Z$

0.14 $^{+0.05}_{-0.04}$ ± 0.03 29 18 ABREU 95S DLPH $e^+ e^- \rightarrow Z$

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

0.088 ± 0.021 ± 0.021 55 19 BUSKULIC 95L ALEP Repl. by BARATE 98D

0.17 ± 0.07 ± 0.04 21 20 BUSKULIC 92E ALEP $\Lambda_c^+ \rightarrow \rho K^- \pi^+$

¹⁷ BARATE 98D reports $[\Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \bar{\nu}_\ell \text{ anything})/\Gamma_{\text{total}}] \times [B(\bar{b} \rightarrow b\text{-baryon})] = 0.0086 \pm 0.0007 \pm 0.0014$. We divide by our best value $B(\bar{b} \rightarrow b\text{-baryon}) = (8.6 \pm 2.1) \times 10^{-2}$. 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 $\Lambda \ell^+ \ell^-$.

¹⁸ ABREU 95S reports $[\Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \bar{\nu}_\ell \text{ anything})/\Gamma_{\text{total}}] \times [B(\bar{b} \rightarrow b\text{-baryon})] = 0.0118 \pm 0.0026^{+0.0031}_{-0.0021}$. We divide by our best value $B(\bar{b} \rightarrow b\text{-baryon}) = (8.6 \pm 2.1) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

¹⁹ BUSKULIC 95L reports $[\Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \bar{\nu}_\ell \text{ anything})/\Gamma_{\text{total}}] \times [B(\bar{b} \rightarrow b\text{-baryon})] = 0.00755 \pm 0.0014 \pm 0.0012$. We divide by our best value $B(\bar{b} \rightarrow b\text{-baryon}) = (8.6 \pm 2.1) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

²⁰ BUSKULIC 92E reports $[\Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \bar{\nu}_\ell \text{ anything})/\Gamma_{\text{total}}] \times [B(\bar{b} \rightarrow b\text{-baryon})] = 0.015 \pm 0.0035 \pm 0.0045$. We divide by our best value $B(\bar{b} \rightarrow b\text{-baryon}) = (8.6 \pm 2.1) \times 10^{-2}$. 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.

$\Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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0.050 $^{+0.011+0.016}_{-0.008-0.012}$ 21 ABDALLAH 04A DLPH $e^+ e^- \rightarrow Z^0$

²¹ 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 $\rho^2 = 2.03 \pm 0.46^{+0.72}_{-1.00}$.

$\Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell)/\Gamma(\Lambda_c^+ \pi^-)$ Γ_8/Γ_3

VALUE	DOCUMENT ID	TECN	COMMENT
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16.6 ± 3.0 $^{+2.8}_{-3.6}$ AALTONEN 09E CDF $p\bar{p}$ at 1.96 TeV

$\Gamma(\Lambda_c^+ \pi^+ \pi^- \ell^- \bar{\nu}_\ell)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
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0.056 $^{+0.031}_{-0.030}$ 22 ABDALLAH 04A DLPH $e^+ e^- \rightarrow Z^0$

²² Derived from the fraction of $\Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \bar{\nu}_\ell) / (\Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \ell^- \bar{\nu}_\ell) + \Gamma(\Lambda_b^0 \rightarrow \Lambda_c^+ \pi^+ \pi^- \ell^- \bar{\nu}_\ell)) = 0.47^{+0.10+0.07}_{-0.08-0.06}$.

$\Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell) / [\Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell) + \Gamma(\Lambda_c^+ \pi^+ \pi^- \ell^- \bar{\nu}_\ell)]$				$\Gamma_8 / (\Gamma_8 + \Gamma_9)$
VALUE	DOCUMENT ID	TECN	COMMENT	
$0.47^{+0.10+0.07}_{-0.08-0.06}$	ABDALLAH 04A	DLPH	$e^+ e^- \rightarrow Z^0$	

$\Gamma(\Lambda_c(2595)^+ \ell^- \bar{\nu}_\ell) / \Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell)$				Γ_{10} / Γ_8
VALUE	DOCUMENT ID	TECN	COMMENT	
$0.126 \pm 0.033^{+0.047}_{-0.038}$	AALTONEN 09E	CDF	$p\bar{p}$ at 1.96 TeV	

$\Gamma(\Lambda_c(2625)^+ \ell^- \bar{\nu}_\ell) / \Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell)$				Γ_{11} / Γ_8
VALUE	DOCUMENT ID	TECN	COMMENT	
$0.210 \pm 0.042^{+0.071}_{-0.050}$	AALTONEN 09E	CDF	$p\bar{p}$ at 1.96 TeV	

$[\frac{1}{2}\Gamma(\Sigma_c(2455)^0 \pi^+ \ell^- \bar{\nu}_\ell) + \frac{1}{2}\Gamma(\Sigma_c(2455)^{++} \pi^- \ell^- \bar{\nu}_\ell)] / \Gamma(\Lambda_c^+ \ell^- \bar{\nu}_\ell)$				$(\frac{1}{2}\Gamma_{12} + \frac{1}{2}\Gamma_{13}) / \Gamma_8$
VALUE	DOCUMENT ID	TECN	COMMENT	
$0.054 \pm 0.022^{+0.021}_{-0.018}$	AALTONEN 09E	CDF	$p\bar{p}$ at 1.96 TeV	

$\Gamma(p h^-) / \Gamma_{\text{total}}$				Γ_{14} / Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.3 \times 10^{-5}$	90	²³ ACOSTA 050	CDF	$p\bar{p}$ at 1.96 TeV
²³ Assumes $f_\Lambda / f_d = 0.25$, and equal momentum distribution for Λ_b and B mesons.				

$\Gamma(p \pi^-) / \Gamma_{\text{total}}$				Γ_{15} / Γ
VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT
< 50	90	²⁴ BUSKULIC 96V	ALEP	$e^+ e^- \rightarrow Z$
²⁴ BUSKULIC 96V assumes PDG 96 production fractions for B^0 , B^+ , B_s , b baryons.				

$\Gamma(p K^-) / \Gamma_{\text{total}}$				Γ_{16} / Γ
VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT
< 50	90	²⁵ BUSKULIC 96V	ALEP	$e^+ e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 360	90	²⁶ ADAM 96D	DLPH	$e^+ e^- \rightarrow Z$
²⁵ BUSKULIC 96V assumes PDG 96 production fractions for B^0 , B^+ , B_s , b baryons.				
²⁶ ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.				

$\Gamma(\Lambda \gamma) / \Gamma_{\text{total}}$				Γ_{17} / Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.3 \times 10^{-3}$	90	ACOSTA 02G	CDF	$p\bar{p}$ at 1.8 TeV

REFERENCES

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