



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

The parity of the  $\Lambda_c^+$  is defined to be positive (as are the parities of the proton, neutron, and  $\Lambda$ ). The quark content is  $udc$ . Results of an analysis of  $pK^-\pi^+$  decays (JEZABEK 92) are consistent with  $J = 1/2$ . Nobody doubts that the spin is indeed  $1/2$ .

We have omitted some results that have been superseded by later experiments. The omitted results may be found in earlier editions.

## $\Lambda_c^+$ MASS

Our value in 2004,  $2284.9 \pm 0.6$  MeV, was the average of the measurements now filed below as "not used." The BABAR measurement is so much better that we use it alone. Note that it is about 2.6 (old) standard deviations above the 2004 value.

The fit also includes  $\Sigma_c - \Lambda_c^+$  and  $\Lambda_c^{*+} - \Lambda_c^+$  mass-difference measurements, but this doesn't affect the  $\Lambda_c^+$  mass. The new (in 2006)  $\Lambda_c^+$  mass simply pushes all those other masses higher.

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2286.46 ± 0.14 OUR FIT</b>				
<b>2286.46 ± 0.14</b>	4891	<sup>1</sup> AUBERT,B	05S BABR	$\Lambda K_S^0 K^+$ and $\Sigma^0 K_S^0 K^+$
• • •				We do not use the following data for averages, fits, limits, etc. • • •
2284.7 ± 0.6 ± 0.7	1134	AVERY	91 CLEO	Six modes
2281.7 ± 2.7 ± 2.6	29	ALVAREZ	90B NA14	$pK^-\pi^+$
2285.8 ± 0.6 ± 1.2	101	BARLAG	89 NA32	$pK^-\pi^+$
2284.7 ± 2.3 ± 0.5	5	AGUILAR-...	88B LEBC	$pK^-\pi^+$
2283.1 ± 1.7 ± 2.0	628	ALBRECHT	88C ARG	$pK^-\pi^+$ , $p\bar{K}^0$ , $\Lambda 3\pi$
2286.2 ± 1.7 ± 0.7	97	ANJOS	88B E691	$pK^-\pi^+$
2281 ± 3	2	JONES	87 HBC	$pK^-\pi^+$
2283 ± 3	3	BOSETTI	82 HBC	$pK^-\pi^+$
2290 ± 3	1	CALICCHIO	80 HYBR	$pK^-\pi^+$

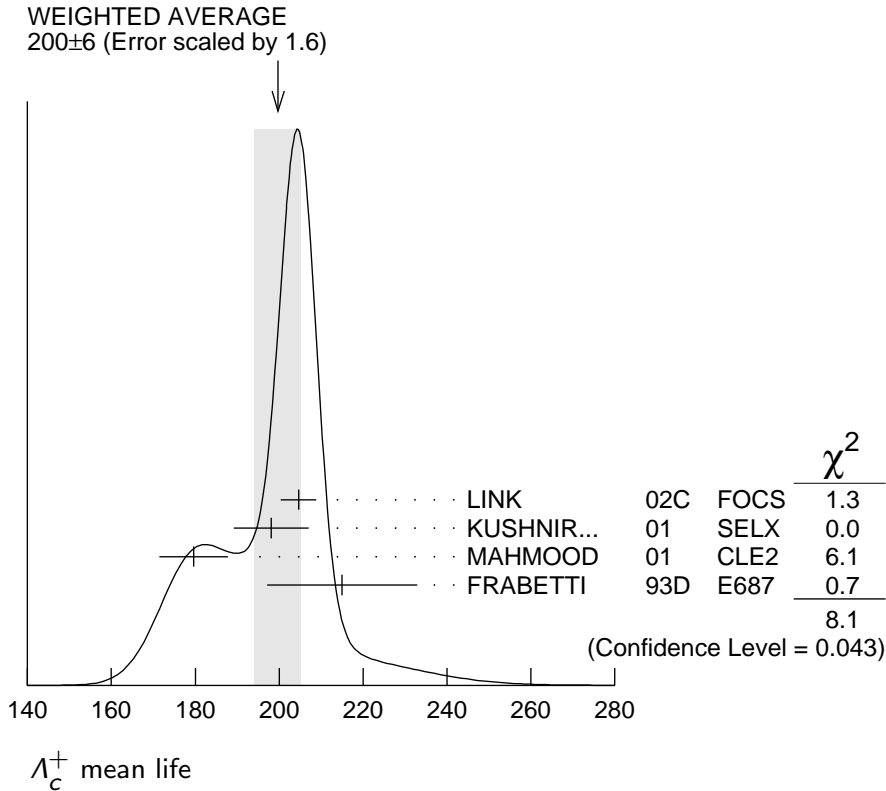
<sup>1</sup>AUBERT,B 05S uses low-Q  $\Lambda K_S^0 K^+$  and  $\Sigma^0 K_S^0 K^+$  decays to minimize systematic errors. The error above includes systematic as well as statistical errors. Many cross checks and adjustments to properties of the BABAR detector, as well as the large number of clean events, make this by far the best measurement of the  $\Lambda_c^+$  mass.

## $\Lambda_c^+$ MEAN LIFE

Measurements with an error  $\geq 100 \times 10^{-15}$  s or with fewer than 20 events have been omitted from the Listings.

<u>VALUE (<math>10^{-15}</math> s)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>200 ± 6 OUR AVERAGE</b>				Error includes scale factor of 1.6. See the ideogram below.
204.6 ± 3.4 ± 2.5	8034	LINK	02C FOCS	$pK^-\pi^+$
198.1 ± 7.0 ± 5.6	1630	KUSHNIR...	01 SELX	$\Lambda_c^+ \rightarrow pK^-\pi^+$

179.6 ± 6.9 ± 4.4	4749	MAHMOOD	01	CLE2	$e^+e^- \approx \Upsilon(4S)$
215 ± 16 ± 8	1340	FRABETTI	93D	E687	$\gamma \text{Be}, \Lambda_c^+ \rightarrow pK^- \pi^+$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
180 ± 30 ± 30	29	ALVAREZ	90	NA14	$\gamma, \Lambda_c^+ \rightarrow pK^- \pi^+$
200 ± 30 ± 30	90	FRABETTI	90	E687	$\gamma \text{Be}, \Lambda_c^+ \rightarrow pK^- \pi^+$
196 <sup>+23</sup> <sub>-20</sub>	101	BARLAG	89	NA32	$pK^- \pi^+ + \text{c.c.}$
220 ± 30 ± 20	97	ANJOS	88B	E691	$pK^- \pi^+ + \text{c.c.}$



### $\Lambda_c^+$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level
<b>Hadronic modes with a <math>p</math>: <math>S = -1</math> final states</b>		
$\Gamma_1$ $pK_S^0$	( 1.58 ± 0.08 ) %	S=1.2
$\Gamma_2$ $pK^- \pi^+$	( 6.35 ± 0.33 ) %	S=1.4
$\Gamma_3$ $p\bar{K}^*(892)^0$	[a] ( 1.98 ± 0.28 ) %	
$\Gamma_4$ $\Delta(1232)^{++} K^-$	( 1.09 ± 0.25 ) %	
$\Gamma_5$ $\Lambda(1520)\pi^+$	[a] ( 2.2 ± 0.5 ) %	
$\Gamma_6$ $pK^- \pi^+$ nonresonant	( 3.5 ± 0.4 ) %	
$\Gamma_7$ $pK_S^0 \pi^0$	( 1.99 ± 0.13 ) %	S=1.1
$\Gamma_8$ $p\bar{K}^0 \eta$	( 1.6 ± 0.4 ) %	

$\Gamma_9$	$\rho K_S^0 \pi^+ \pi^-$	( 1.66 ± 0.12 ) %	S=1.1
$\Gamma_{10}$	$\rho K^- \pi^+ \pi^0$	( 4.9 ± 0.4 ) %	S=1.3
$\Gamma_{11}$	$\rho K^*(892)^- \pi^+$	[a] ( 1.5 ± 0.5 ) %	
$\Gamma_{12}$	$\rho(K^- \pi^+)_{\text{nonresonant}} \pi^0$	( 4.6 ± 0.9 ) %	
$\Gamma_{13}$	$\Delta(1232) \bar{K}^*(892)$	seen	
$\Gamma_{14}$	$\rho K^- 2\pi^+ \pi^-$	( 1.4 ± 1.0 ) × 10 <sup>-3</sup>	
$\Gamma_{15}$	$\rho K^- \pi^+ 2\pi^0$	( 1.0 ± 0.5 ) %	
$\Gamma_{16}$	$\rho K^- \pi^+ 3\pi^0$		

### Hadronic modes with a $\rho$ : $S = 0$ final states

$\Gamma_{17}$	$\rho \pi^+ \pi^-$	( 4.4 ± 2.3 ) × 10 <sup>-3</sup>	
$\Gamma_{18}$	$\rho f_0(980)$	[a] ( 3.5 ± 2.3 ) × 10 <sup>-3</sup>	
$\Gamma_{19}$	$\rho 2\pi^+ 2\pi^-$	( 2.3 ± 1.5 ) × 10 <sup>-3</sup>	
$\Gamma_{20}$	$\rho K^+ K^-$	(10 ± 4 ) × 10 <sup>-4</sup>	
$\Gamma_{21}$	$\rho \phi$	[a] ( 1.04 ± 0.21 ) × 10 <sup>-3</sup>	
$\Gamma_{22}$	$\rho K^+ K^- \text{ non-}\phi$	( 4.4 ± 1.8 ) × 10 <sup>-4</sup>	

### Hadronic modes with a hyperon: $S = -1$ final states

$\Gamma_{23}$	$\Lambda \pi^+$	( 1.30 ± 0.07 ) %	S=1.2
$\Gamma_{24}$	$\Lambda \pi^+ \pi^0$	( 7.1 ± 0.4 ) %	S=1.2
$\Gamma_{25}$	$\Lambda \rho^+$	< 6 %	CL=95%
$\Gamma_{26}$	$\Lambda \pi^- 2\pi^+$	( 3.7 ± 0.4 ) %	S=1.9
$\Gamma_{27}$	$\Sigma(1385)^+ \pi^+ \pi^-, \Sigma^{*+} \rightarrow$ $\Lambda \pi^+$	( 1.0 ± 0.5 ) %	
$\Gamma_{28}$	$\Sigma(1385)^- 2\pi^+, \Sigma^{*-} \rightarrow \Lambda \pi^-$	( 7.8 ± 1.6 ) × 10 <sup>-3</sup>	
$\Gamma_{29}$	$\Lambda \pi^+ \rho^0$	( 1.5 ± 0.6 ) %	
$\Gamma_{30}$	$\Sigma(1385)^+ \rho^0, \Sigma^{*+} \rightarrow \Lambda \pi^+$	( 5 ± 4 ) × 10 <sup>-3</sup>	
$\Gamma_{31}$	$\Lambda \pi^- 2\pi^+ \text{ nonresonant}$	< 1.1 %	CL=90%
$\Gamma_{32}$	$\Lambda \pi^- \pi^0 2\pi^+ \text{ total}$	( 2.3 ± 0.8 ) %	
$\Gamma_{33}$	$\Lambda \pi^+ \eta$	[a] ( 2.3 ± 0.5 ) %	
$\Gamma_{34}$	$\Sigma(1385)^+ \eta$	[a] ( 1.08 ± 0.32 ) %	
$\Gamma_{35}$	$\Lambda \pi^+ \omega$	[a] ( 1.5 ± 0.5 ) %	
$\Gamma_{36}$	$\Lambda \pi^- \pi^0 2\pi^+, \text{ no } \eta \text{ or } \omega$	< 8 × 10 <sup>-3</sup>	CL=90%
$\Gamma_{37}$	$\Lambda K^+ \bar{K}^0$	( 5.7 ± 1.1 ) × 10 <sup>-3</sup>	S=2.0
$\Gamma_{38}$	$\Xi(1690)^0 K^+, \Xi^{*0} \rightarrow \Lambda \bar{K}^0$	( 1.6 ± 0.5 ) × 10 <sup>-3</sup>	
$\Gamma_{39}$	$\Sigma^0 \pi^+$	( 1.29 ± 0.07 ) %	S=1.1
$\Gamma_{40}$	$\Sigma^+ \pi^0$	( 1.24 ± 0.10 ) %	
$\Gamma_{41}$	$\Sigma^+ \eta$	( 7.0 ± 2.3 ) × 10 <sup>-3</sup>	
$\Gamma_{42}$	$\Sigma^+ \pi^+ \pi^-$	( 4.57 ± 0.29 ) %	S=1.2
$\Gamma_{43}$	$\Sigma^+ \rho^0$	< 1.7 %	CL=95%
$\Gamma_{44}$	$\Sigma^- 2\pi^+$	( 2.1 ± 0.4 ) %	
$\Gamma_{45}$	$\Sigma^0 \pi^+ \pi^0$	( 2.3 ± 0.9 ) %	
$\Gamma_{46}$	$\Sigma^0 \pi^- 2\pi^+$	( 1.13 ± 0.29 ) %	
$\Gamma_{47}$	$\Sigma^+ \pi^+ \pi^- \pi^0$	—	

$\Gamma_{48}$	$\Sigma^+ \omega$	[a]	$(1.74 \pm 0.21) \%$	
$\Gamma_{49}$	$\Sigma^+ K^+ K^-$		$(3.6 \pm 0.4) \times 10^{-3}$	
$\Gamma_{50}$	$\Sigma^+ \phi$	[a]	$(4.0 \pm 0.6) \times 10^{-3}$	S=1.1
$\Gamma_{51}$	$\Xi(1690)^0 K^+, \Xi^{*0} \rightarrow \Sigma^+ K^-$		$(1.03 \pm 0.26) \times 10^{-3}$	
$\Gamma_{52}$	$\Sigma^+ K^+ K^-$ nonresonant		$< 8 \times 10^{-4}$	CL=90%
$\Gamma_{53}$	$\Xi^0 K^+$		$(5.0 \pm 1.2) \times 10^{-3}$	
$\Gamma_{54}$	$\Xi^- K^+ \pi^+$		$(6.2 \pm 0.6) \times 10^{-3}$	S=1.1
$\Gamma_{55}$	$\Xi(1530)^0 K^+$	[a]	$(3.3 \pm 0.9) \times 10^{-3}$	

### Hadronic modes with a hyperon: $S = 0$ final states

$\Gamma_{56}$	$\Lambda K^+$		$(6.1 \pm 1.2) \times 10^{-4}$	
$\Gamma_{57}$	$\Lambda K^+ \pi^+ \pi^-$		$< 5 \times 10^{-4}$	CL=90%
$\Gamma_{58}$	$\Sigma^0 K^+$		$(5.2 \pm 0.8) \times 10^{-4}$	
$\Gamma_{59}$	$\Sigma^0 K^+ \pi^+ \pi^-$		$< 2.6 \times 10^{-4}$	CL=90%
$\Gamma_{60}$	$\Sigma^+ K^+ \pi^-$		$(2.1 \pm 0.6) \times 10^{-3}$	
$\Gamma_{61}$	$\Sigma^+ K^*(892)^0$	[a]	$(3.6 \pm 1.0) \times 10^{-3}$	
$\Gamma_{62}$	$\Sigma^- K^+ \pi^+$		$< 1.2 \times 10^{-3}$	CL=90%

### Doubly Cabibbo-suppressed modes

$\Gamma_{63}$	$p K^+ \pi^-$		$< 2.9 \times 10^{-4}$	CL=90%
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### Semileptonic modes

$\Gamma_{64}$	$\Lambda e^+ \nu_e$		$(3.6 \pm 0.4) \%$	
$\Gamma_{65}$	$\Lambda \mu^+ \nu_\mu$			

### Inclusive modes

$\Gamma_{66}$	$e^+$ anything		$(4.5 \pm 1.7) \%$	
$\Gamma_{67}$	$p e^+$ anything		$(1.8 \pm 0.9) \%$	
$\Gamma_{68}$	$\Lambda e^+$ anything			
$\Gamma_{69}$	$p$ anything		$(50 \pm 16) \%$	
$\Gamma_{70}$	$p$ anything (no $\Lambda$ )		$(12 \pm 19) \%$	
$\Gamma_{71}$	$p$ hadrons			
$\Gamma_{72}$	$n$ anything		$(50 \pm 16) \%$	
$\Gamma_{73}$	$n$ anything (no $\Lambda$ )		$(29 \pm 17) \%$	
$\Gamma_{74}$	$\Lambda$ anything		$(35 \pm 11) \%$	S=1.4
$\Gamma_{75}$	$\Sigma^\pm$ anything	[b]	$(10 \pm 5) \%$	
$\Gamma_{76}$	3prongs		$(24 \pm 8) \%$	

### $\Delta C = 1$ weak neutral current ( $C1$ ) modes, or Lepton Family number ( $LF$ ), or Lepton number ( $L$ ), or Baryon number ( $B$ ) violating modes

$\Gamma_{77}$	$p e^+ e^-$	$C1$	$< 5.5 \times 10^{-6}$	CL=90%
$\Gamma_{78}$	$p \mu^+ \mu^-$	$C1$	$< 4.4 \times 10^{-5}$	CL=90%
$\Gamma_{79}$	$p e^+ \mu^-$	$LF$	$< 9.9 \times 10^{-6}$	CL=90%
$\Gamma_{80}$	$p e^- \mu^+$	$LF$	$< 1.9 \times 10^{-5}$	CL=90%

$\Gamma_{81}$	$\bar{p}2e^+$	$L,B$	$< 2.7$	$\times 10^{-6}$	CL=90%
$\Gamma_{82}$	$\bar{p}2\mu^+$	$L,B$	$< 9.4$	$\times 10^{-6}$	CL=90%
$\Gamma_{83}$	$\bar{p}e^+\mu^+$	$L,B$	$< 1.6$	$\times 10^{-5}$	CL=90%
$\Gamma_{84}$	$\Sigma^-\mu^+\mu^+$	$L$	$< 7.0$	$\times 10^{-4}$	CL=90%

[a] This branching fraction includes all the decay modes of the final-state resonance.

[b] The value is for the sum of the charge states or particle/antiparticle states indicated.

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### CONSTRAINED FIT INFORMATION

An overall fit to 36 branching ratios uses 57 measurements and one constraint to determine 19 parameters. The overall fit has a  $\chi^2 = 39.9$  for 39 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients  $\langle \delta x_i \delta x_j \rangle / (\delta x_i \delta x_j)$ , 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.

$x_2$	50									
$x_7$	43	59								
$x_9$	48	57	37							
$x_{10}$	30	83	48	54						
$x_{23}$	46	72	47	36	53					
$x_{24}$	37	66	44	31	52	69				
$x_{26}$	53	13	13	44	9	15	6			
$x_{37}$	14	24	15	13	18	27	20	4		
$x_{39}$	49	58	40	36	42	74	59	28	20	
$x_{40}$	36	42	32	25	30	35	34	14	11	31
$x_{42}$	42	79	48	52	72	54	52	18	18	45
$x_{44}$	15	29	17	17	24	20	19	4	7	17
$x_{46}$	17	11	8	15	9	9	7	25	3	11
$x_{48}$	19	31	19	24	29	20	19	13	7	17
$x_{49}$	22	41	25	26	37	28	27	9	9	24
$x_{50}$	17	33	20	22	30	23	22	8	8	19
$x_{54}$	26	43	27	22	33	53	38	8	15	40
	$x_1$	$x_2$	$x_7$	$x_9$	$x_{10}$	$x_{23}$	$x_{24}$	$x_{26}$	$x_{37}$	$x_{39}$

x <sub>42</sub>	34						
x <sub>44</sub>	12	26					
x <sub>46</sub>	7	11	3				
x <sub>48</sub>	15	28	9	6			
x <sub>49</sub>	18	49	13	5	14		
x <sub>50</sub>	14	42	11	4	12	20	
x <sub>54</sub>	20	33	12	5	12	17	14
	x <sub>40</sub>	x <sub>42</sub>	x <sub>44</sub>	x <sub>46</sub>	x <sub>48</sub>	x <sub>49</sub>	x <sub>50</sub>

## $\Lambda_c^+$ BRANCHING RATIOS

A few really obsolete results have been omitted.

### Hadronic modes with a $p$ : $S = -1$ final states

#### $\Gamma(pK_S^0)/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.58 ± 0.08 OUR FIT</b>				Error includes scale factor of 1.2.
<b>1.52 ± 0.08 ± 0.03</b>	1243	ABLIKIM	16	BES3 $e^+e^- \rightarrow \Lambda_c \bar{\Lambda}_c$ , 4.599 GeV

#### $\Gamma(pK_S^0)/\Gamma(pK^-\pi^+)$ $\Gamma_1/\Gamma_2$

Measurements given as a  $\bar{K}^0$  ratio have been divided by 2 to convert to a  $K_S^0$  ratio.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.249 ± 0.013 OUR FIT</b>				Error includes scale factor of 1.5.
<b>0.234 ± 0.020 OUR AVERAGE</b>				
0.23 ± 0.01 ± 0.02	1025	ALAM	98	CLE2 $e^+e^- \approx \Upsilon(4S)$
0.22 ± 0.04 ± 0.03	133	AVERY	91	CLEO $e^+e^-$ 10.5 GeV
0.28 ± 0.09 ± 0.07	45	ANJOS	90	E691 $\gamma\text{Be}$ 70–260 GeV
0.31 ± 0.08 ± 0.02	73	ALBRECHT	88C	ARG $e^+e^-$ 10 GeV

#### $\Gamma(pK^-\pi^+)/\Gamma_{\text{total}}$ $\Gamma_2/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>6.35 ± 0.33 OUR FIT</b>				Error includes scale factor of 1.4.
<b>6.3 ± 0.5 OUR AVERAGE</b>				Error includes scale factor of 2.0.
5.84 ± 0.27 ± 0.23	6.3k	ABLIKIM	16	BES3 $e^+e^- \rightarrow \Lambda_c \bar{\Lambda}_c$ , 4.599 GeV
6.84 ± 0.24 $^{+0.21}_{-0.27}$	1.4k	<sup>1</sup> ZUPANC	14	BELL $e^+e^- \rightarrow D^{(*)-} \bar{p}\pi^+$ recoil

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

5.0 ± 1.3	<sup>2</sup> PDG	02	See footnote
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<sup>1</sup>This ZUPANC 14 value is the FIRST-EVER model-independent measurement of a  $\Lambda_c^+$  branching fraction.

<sup>2</sup>See the note by P. Burchat, " $\Lambda_c^+$  Branching Fractions," in any edition of the Review from 2002 through 2014 for how this value was obtained. It is now obsolete.

$$\Gamma(\rho\bar{K}^*(892)^0)/\Gamma(\rho K^- \pi^+) \quad \Gamma_3/\Gamma_2$$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.31±0.04 OUR AVERAGE**

0.29±0.04±0.03		<sup>1</sup> AITALA	00 E791	$\pi^- N$ , 500 GeV
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0.35 <sup>+0.06</sup> <sub>-0.07</sub> ±0.03	39	BOZEK	93 NA32	$\pi^-$ Cu 230 GeV
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0.42±0.24	12	BASILE	81B CNTR	$\rho\rho \rightarrow \Lambda_c^+ e^- X$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.35±0.11		BARLAG	90D NA32	See BOZEK 93
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<sup>1</sup> AITALA 00 makes a coherent 5-dimensional amplitude analysis of  $946 \pm 38 \Lambda_c^+ \rightarrow \rho K^- \pi^+$  decays.

$$\Gamma(\Delta(1232)^{++} K^-)/\Gamma(\rho K^- \pi^+) \quad \Gamma_4/\Gamma_2$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.17±0.04 OUR AVERAGE** Error includes scale factor of 1.1.

0.18±0.03±0.03		<sup>1</sup> AITALA	00 E791	$\pi^- N$ , 500 GeV
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0.12 <sup>+0.04</sup> <sub>-0.05</sub> ±0.05	14	BOZEK	93 NA32	$\pi^-$ Cu 230 GeV
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0.40±0.17	17	BASILE	81B CNTR	$\rho\rho \rightarrow \Lambda_c^+ e^- X$
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<sup>1</sup> AITALA 00 makes a coherent 5-dimensional amplitude analysis of  $946 \pm 38 \Lambda_c^+ \rightarrow \rho K^- \pi^+$  decays.

$$\Gamma(\Lambda(1520)\pi^+)/\Gamma(\rho K^- \pi^+) \quad \Gamma_5/\Gamma_2$$

Unseen decay modes of the  $\Lambda(1520)$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.35±0.08 OUR AVERAGE**

0.34±0.08±0.05		<sup>1</sup> AITALA	00 E791	$\pi^- N$ , 500 GeV
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0.40 <sup>+0.18</sup> <sub>-0.13</sub> ±0.09	12	BOZEK	93 NA32	$\pi^-$ Cu 230 GeV
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<sup>1</sup> AITALA 00 makes a coherent 5-dimensional amplitude analysis of  $946 \pm 38 \Lambda_c^+ \rightarrow \rho K^- \pi^+$  decays.

$$\Gamma(\rho K^- \pi^+ \text{ nonresonant})/\Gamma(\rho K^- \pi^+) \quad \Gamma_6/\Gamma_2$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.55±0.06 OUR AVERAGE**

0.55±0.06±0.04		<sup>1</sup> AITALA	00 E791	$\pi^- N$ , 500 GeV
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0.56 <sup>+0.07</sup> <sub>-0.09</sub> ±0.05	71	BOZEK	93 NA32	$\pi^-$ Cu 230 GeV
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<sup>1</sup> AITALA 00 makes a coherent 5-dimensional amplitude analysis of  $946 \pm 38 \Lambda_c^+ \rightarrow \rho K^- \pi^+$  decays.

$$\Gamma(\rho K_S^0 \pi^0)/\Gamma_{\text{total}} \quad \Gamma_7/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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**1.99±0.13 OUR FIT** Error includes scale factor of 1.1.

<b>1.87±0.13±0.05</b>	558	ABLIKIM	16 BES3	$e^+ e^- \rightarrow \Lambda_c \bar{\Lambda}_c$ , 4.599 GeV
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$\Gamma(pK_S^0\pi^0)/\Gamma(pK^-\pi^+)$   $\Gamma_7/\Gamma_2$

Measurements given as a  $\bar{K}^0$  ratio have been divided by 2 to convert to a  $K_S^0$  ratio.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.313±0.018 OUR FIT</b>				
<b>0.33 ±0.03 ±0.04</b>	774	ALAM	98	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Gamma(p\bar{K}^0\eta)/\Gamma(pK^-\pi^+)$   $\Gamma_8/\Gamma_2$

Unseen decay modes of the  $\eta$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.25±0.04±0.04</b>	57	AMMAR	95	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Gamma(pK_S^0\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_9/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.66±0.12 OUR FIT</b>				Error includes scale factor of 1.1.
<b>1.53±0.11±0.09</b>	485	ABLIKIM	16	BES3 $e^+e^- \rightarrow \Lambda_c\bar{\Lambda}_c$ , 4.599 GeV

$\Gamma(pK_S^0\pi^+\pi^-)/\Gamma(pK^-\pi^+)$   $\Gamma_9/\Gamma_2$

Measurements given as a  $\bar{K}^0$  ratio have been divided by 2 to convert to a  $K_S^0$  ratio.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.261±0.016 OUR FIT</b>				Error includes scale factor of 1.2.
<b>0.257±0.031 OUR AVERAGE</b>				
0.26 ±0.02 ±0.03	985	ALAM	98	CLE2 $e^+e^- \approx \Upsilon(4S)$
0.22 ±0.06 ±0.02	83	AVERY	91	CLEO $e^+e^-$ 10.5 GeV
0.49 ±0.18 ±0.04	12	BARLAG	90D	NA32 $\pi^-$ 230 GeV

$\Gamma(pK^-\pi^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{10}/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>4.9 ±0.4 OUR FIT</b>				Error includes scale factor of 1.3.
<b>4.53±0.23±0.30</b>	1849	ABLIKIM	16	BES3 $e^+e^- \rightarrow \Lambda_c\bar{\Lambda}_c$ , 4.599 GeV

$\Gamma(pK^-\pi^+\pi^0)/\Gamma(pK^-\pi^+)$   $\Gamma_{10}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.777±0.033 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.67 ±0.04 ±0.11</b>	2606	ALAM	98	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Gamma(pK^*(892)^-\pi^+)/\Gamma(pK_S^0\pi^+\pi^-)$   $\Gamma_{11}/\Gamma_9$

Unseen decay modes of the  $K^*(892)^-$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.88±0.28</b>	17	ALEEV	94	BIS2 $nN$ 20–70 GeV

$\Gamma(p(K^-\pi^+)_{\text{nonresonant}}\pi^0)/\Gamma(pK^-\pi^+)$   $\Gamma_{12}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.73±0.12±0.05</b>	67	BOZEK	93	NA32 $\pi^-$ Cu 230 GeV

$\Gamma(\Delta(1232)\bar{K}^*(892))/\Gamma_{\text{total}}$   $\Gamma_{13}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>seen</b>	35	AMENDOLIA	87	SPEC $\gamma$ Ge-Si



$\Gamma(\rho K^- 2\pi^+ \pi^-)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{14}/\Gamma_2$ 

<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.022±0.015</b>		BARLAG	90D NA32	$\pi^-$ 230 GeV

 $\Gamma(\rho K^- \pi^+ 2\pi^0)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{15}/\Gamma_2$ 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.16±0.07±0.03</b>	15	BOZEK	93 NA32	$\pi^-$ Cu 230 GeV

 $\Gamma(\rho K^- \pi^+ 3\pi^0)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{16}/\Gamma_2$ 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.10±0.06±0.02	8	BOZEK	93 NA32	$\pi^-$ Cu 230 GeV

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

————— **Hadronic modes with a  $\rho$ :  $S = 0$  final states** ————— $\Gamma(\rho \pi^+ \pi^-)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{17}/\Gamma_2$ 

<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.069±0.036</b>		BARLAG	90D NA32	$\pi^-$ 230 GeV

 $\Gamma(\rho f_0(980))/\Gamma(\rho K^- \pi^+)$   $\Gamma_{18}/\Gamma_2$ Unseen decay modes of the  $f_0(980)$  are included.

<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.055±0.036</b>		BARLAG	90D NA32	$\pi^-$ 230 GeV

 $\Gamma(\rho 2\pi^+ 2\pi^-)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{19}/\Gamma_2$ 

<u>VALUE</u>		<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.036±0.023</b>		BARLAG	90D NA32	$\pi^-$ 230 GeV

 $\Gamma(\rho K^+ K^-)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{20}/\Gamma_2$ 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.015±0.006 OUR AVERAGE</b>		Error includes scale factor of 2.1.		
0.014±0.002±0.002	676	ABE	02C BELL	$e^+ e^- \approx \Upsilon(4S)$
0.039±0.009±0.007	214	ALEXANDER	96C CLE2	$e^+ e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.096±0.029±0.010	30	FRABETTI	93H E687	$\gamma$ Be, $\bar{E}_\gamma$ 220 GeV
0.048±0.027		BARLAG	90D NA32	$\pi^-$ 230 GeV

 $\Gamma(\rho \phi)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{21}/\Gamma_2$ Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.0164±0.0032 OUR AVERAGE</b>		Error includes scale factor of 1.2.		
0.015 ±0.002 ±0.002	345	ABE	02C BELL	$e^+ e^- \approx \Upsilon(4S)$
0.024 ±0.006 ±0.003	54	ALEXANDER	96C CLE2	$e^+ e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.040 ±0.027		BARLAG	90D NA32	$\pi^-$ 230 GeV

$\Gamma(\rho K^+ K^- \text{ non-}\phi)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{22}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.007±0.002±0.002</b>	344	ABE	02C BELL	$e^+e^- \approx \Upsilon(4S)$

————— Hadronic modes with a hyperon:  $S = -1$  final states —————

$\Gamma(\Lambda\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{23}/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.30±0.07 OUR FIT</b>				Error includes scale factor of 1.2.
<b>1.24±0.07±0.03</b>	706	ABLIKIM	16 BES3	$e^+e^- \rightarrow \Lambda_c \bar{\Lambda}_c, 4.599 \text{ GeV}$

$\Gamma(\Lambda\pi^+)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{23}/\Gamma_2$

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.204±0.009 OUR FIT</b>					Error includes scale factor of 1.1.
<b>0.204±0.019 OUR AVERAGE</b>					
0.217±0.013±0.020		750	LINK	05F FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180 \text{ GeV}$
0.18 ±0.03 ±0.04			ALBRECHT	92 ARG	$e^+e^- \approx 10.4 \text{ GeV}$
0.18 ±0.03 ±0.03		87	AVERY	91 CLEO	$e^+e^- 10.5 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.33		90	ANJOS	90 E691	$\gamma \text{ Be } 70\text{--}260 \text{ GeV}$
<0.16		90	ALBRECHT	88C ARG	$e^+e^- 10 \text{ GeV}$

$\Gamma(\Lambda\pi^+\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{24}/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>7.1 ±0.4 OUR FIT</b>				Error includes scale factor of 1.2.
<b>7.01±0.37±0.19</b>	1497	ABLIKIM	16 BES3	$e^+e^- \rightarrow \Lambda_c \bar{\Lambda}_c, 4.599 \text{ GeV}$

$\Gamma(\Lambda\pi^+\pi^0)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{24}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.11±0.05 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.73±0.09±0.16</b>	464	AVERY	94 CLE2	$e^+e^- \approx \Upsilon(3S), \Upsilon(4S)$

$\Gamma(\Lambda\rho^+)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{25}/\Gamma_2$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.95</b>	95	AVERY	94 CLE2	$e^+e^- \approx \Upsilon(3S), \Upsilon(4S)$

$\Gamma(\Lambda\pi^- 2\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{26}/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3.7 ±0.4 OUR FIT</b>				Error includes scale factor of 1.9.
<b>3.81±0.24±0.18</b>	609	ABLIKIM	16 BES3	$e^+e^- \rightarrow \Lambda_c \bar{\Lambda}_c, 4.599 \text{ GeV}$

$\Gamma(\Lambda\pi^- 2\pi^+)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{26}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.58 ±0.06 OUR FIT</b>				Error includes scale factor of 2.8.
<b>0.522±0.032 OUR AVERAGE</b>				
0.508±0.024±0.024	1356	LINK	05F FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180 \text{ GeV}$
0.65 ±0.11 ±0.12	289	AVERY	91 CLEO	$e^+e^- 10.5 \text{ GeV}$
0.82 ±0.29 ±0.27	44	ANJOS	90 E691	$\gamma \text{ Be } 70\text{--}260 \text{ GeV}$
0.94 ±0.41 ±0.13	10	BARLAG	90D NA32	$\pi^- 230 \text{ GeV}$
0.61 ±0.16 ±0.04	105	ALBRECHT	88C ARG	$e^+e^- 10 \text{ GeV}$

$\Gamma(\Sigma(1385)^+\pi^+\pi^-, \Sigma^{*+} \rightarrow \Lambda\pi^+)/\Gamma(\Lambda\pi^-2\pi^+)$   $\Gamma_{27}/\Gamma_{26}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.28±0.10±0.08</b>	LINK	05F	FOCS $\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\Sigma(1385)^-2\pi^+, \Sigma^{*-} \rightarrow \Lambda\pi^-)/\Gamma(\Lambda\pi^-2\pi^+)$   $\Gamma_{28}/\Gamma_{26}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.21±0.03±0.02</b>	LINK	05F	FOCS $\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\Lambda\pi^+\rho^0)/\Gamma(\Lambda\pi^-2\pi^+)$   $\Gamma_{29}/\Gamma_{26}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.40±0.12±0.12</b>	LINK	05F	FOCS $\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\Sigma(1385)^+\rho^0, \Sigma^{*+} \rightarrow \Lambda\pi^+)/\Gamma(\Lambda\pi^-2\pi^+)$   $\Gamma_{30}/\Gamma_{26}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.14±0.09±0.07</b>	LINK	05F	FOCS $\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\Lambda\pi^-2\pi^+ \text{ nonresonant})/\Gamma(\Lambda\pi^-2\pi^+)$   $\Gamma_{31}/\Gamma_{26}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.3</b>	90	LINK	05F	FOCS $\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(\Lambda\pi^-\pi^02\pi^+ \text{ total})/\Gamma(\rho K^-\pi^+)$   $\Gamma_{32}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.36±0.09±0.09</b>	50	<sup>1</sup> CRONIN-HEN..03	CLE3	$e^+e^- \approx \Upsilon(4S)$

<sup>1</sup> CRONIN-HENNESSY 03 finds this channel to be dominantly  $\Lambda\eta\pi^+$  and  $\Lambda\omega\pi^+$ ; see below.

$\Gamma(\Lambda\pi^+\eta)/\Gamma(\rho K^-\pi^+)$   $\Gamma_{33}/\Gamma_2$

Unseen decay modes of the  $\eta$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.36±0.07 OUR AVERAGE</b>				
0.41±0.17±0.10	11	CRONIN-HEN..03	CLE3	$e^+e^- \approx \Upsilon(4S)$
0.35±0.05±0.06	116	AMMAR	95	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Sigma(1385)^+\eta)/\Gamma(\rho K^-\pi^+)$   $\Gamma_{34}/\Gamma_2$

Unseen decay modes of the  $\Sigma(1385)^+$  and  $\eta$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.17±0.04±0.03</b>	54	AMMAR	95	CLE2 $e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Lambda\pi^+\omega)/\Gamma(\rho K^-\pi^+)$   $\Gamma_{35}/\Gamma_2$

Unseen decay modes of the  $\omega$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.24±0.06±0.06</b>	32	CRONIN-HEN..03	CLE3	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Lambda\pi^-\pi^02\pi^+, \text{ no } \eta \text{ or } \omega)/\Gamma(\rho K^-\pi^+)$   $\Gamma_{36}/\Gamma_2$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.13</b>	90	CRONIN-HEN..03	CLE3	$e^+e^- \approx \Upsilon(4S)$

$\Gamma(\Lambda K^+ \bar{K}^0)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{37}/\Gamma_2$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.089±0.018 OUR FIT</b>				Error includes scale factor of 2.0.
<b>0.131±0.020 OUR AVERAGE</b>				
0.142±0.018±0.022	251	LINK	05F FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV
0.12 ±0.02 ±0.02	59	AMMAR	95 CLE2	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\Xi(1690)^0 K^+, \Xi^{*0} \rightarrow \Lambda \bar{K}^0)/\Gamma(\Lambda K^+ \bar{K}^0)$   $\Gamma_{38}/\Gamma_{37}$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.28±0.07 OUR AVERAGE</b>				
0.32±0.10±0.04	84 ± 24	LINK	05F FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV
0.26±0.08±0.03	93	ABE	02c BELL	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\Lambda K^+ \bar{K}^0)/\Gamma(\Lambda \pi^+)$   $\Gamma_{37}/\Gamma_{23}$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.44 ±0.08 OUR FIT</b>				Error includes scale factor of 2.1.
<b>0.395±0.026±0.036</b>	460 ± 30	AUBERT	07U BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\Sigma^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{39}/\Gamma$ 

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.29±0.07 OUR FIT</b>				Error includes scale factor of 1.1.
<b>1.27±0.08±0.03</b>	522	ABLIKIM	16 BES3	$e^+ e^- \rightarrow \Lambda_c \bar{\Lambda}_c, 4.599$ GeV

 $\Gamma(\Sigma^0 \pi^+)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{39}/\Gamma_2$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.203±0.010 OUR FIT</b>				Error includes scale factor of 1.2.
<b>0.20 ±0.04 OUR AVERAGE</b>				
0.21 ±0.02 ±0.04	196	AVERY	94 CLE2	$e^+ e^- \approx \Upsilon(3S), \Upsilon(4S)$
0.17 ±0.06 ±0.04		ALBRECHT	92 ARG	$e^+ e^- \approx 10.4$ GeV

 $\Gamma(\Sigma^0 \pi^+)/\Gamma(\Lambda \pi^+)$   $\Gamma_{39}/\Gamma_{23}$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.99 ±0.04 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.98 ±0.05 OUR AVERAGE</b>				
0.977±0.015±0.051	33k	AUBERT	07U BABR	$e^+ e^- \approx \Upsilon(4S)$
1.09 ±0.11 ±0.19	750	LINK	05F FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

 $\Gamma(\Sigma^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{40}/\Gamma$ 

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.24±0.10 OUR FIT</b>				
<b>1.18±0.10±0.03</b>	309	ABLIKIM	16 BES3	$e^+ e^- \rightarrow \Lambda_c \bar{\Lambda}_c, 4.599$ GeV

 $\Gamma(\Sigma^+ \pi^0)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{40}/\Gamma_2$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.196±0.015 OUR FIT</b>				
<b>0.20 ±0.03 ±0.03</b>	93	KUBOTA	93 CLE2	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\Sigma^+ \eta)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{41}/\Gamma_2$ Unseen decay modes of the  $\eta$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.11±0.03±0.02</b>	26	AMMAR	95 CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Sigma^+ \pi^+ \pi^-)/\Gamma_{\text{total}}$					$\Gamma_{42}/\Gamma$
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>4.57±0.29 OUR FIT</b>				Error includes scale factor of 1.2.	
<b>4.25±0.24±0.20</b>	1156	ABLIKIM	16	BES3	$e^+ e^- \rightarrow \Lambda_c \bar{\Lambda}_c$ , 4.599 GeV
$\Gamma(\Sigma^+ \pi^+ \pi^-)/\Gamma(pK^- \pi^+)$					$\Gamma_{42}/\Gamma_2$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.720±0.029 OUR FIT</b>				Error includes scale factor of 1.1.	
<b>0.69 ±0.08 OUR AVERAGE</b>					
0.72 ±0.14	47 ± 9	VAZQUEZ-JA..08	SELX	$\Sigma^-$ nucleus, 600 GeV	
0.74 ±0.07 ±0.09	487	KUBOTA	93	CLE2	$e^+ e^- \approx \Upsilon(4S)$
0.54 <sup>+0.18</sup> <sub>-0.15</sub>	11	BARLAG	92	NA32	$\pi^-$ Cu 230 GeV
$\Gamma(\Sigma^+ \rho^0)/\Gamma(pK^- \pi^+)$					$\Gamma_{43}/\Gamma_2$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<b>&lt;0.27</b>	95	KUBOTA	93	CLE2	$e^+ e^- \approx \Upsilon(4S)$
$\Gamma(\Sigma^- 2\pi^+)/\Gamma(pK^- \pi^+)$					$\Gamma_{44}/\Gamma_2$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.33 ±0.06 OUR FIT</b>					
<b>0.314±0.067</b>	30 ± 6	VAZQUEZ-JA..08	SELX	$\Sigma^-$ nucleus, 600 GeV	
$\Gamma(\Sigma^- 2\pi^+)/\Gamma(\Sigma^+ \pi^+ \pi^-)$					$\Gamma_{44}/\Gamma_{42}$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.46±0.08 OUR FIT</b>					
<b>0.53±0.15±0.07</b>	56	FRABETTI	94E	E687	$\gamma$ Be, $\bar{E}_\gamma$ 220 GeV
$\Gamma(\Sigma^0 \pi^+ \pi^0)/\Gamma(pK^- \pi^+)$					$\Gamma_{45}/\Gamma_2$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.36±0.09±0.10</b>	117	AVERY	94	CLE2	$e^+ e^- \approx \Upsilon(3S), \Upsilon(4S)$
$\Gamma(\Sigma^0 \pi^- 2\pi^+)/\Gamma(pK^- \pi^+)$					$\Gamma_{46}/\Gamma_2$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.18±0.05 OUR FIT</b>					
<b>0.21±0.05±0.05</b>	90	AVERY	94	CLE2	$e^+ e^- \approx \Upsilon(3S), \Upsilon(4S)$
$\Gamma(\Sigma^0 \pi^- 2\pi^+)/\Gamma(\Lambda \pi^- 2\pi^+)$					$\Gamma_{46}/\Gamma_{26}$
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>0.30±0.08 OUR FIT</b>					
<b>0.26±0.06±0.09</b>	480	LINK	05F	FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV
$\Gamma(\Sigma^+ \omega)/\Gamma_{\text{total}}$					$\Gamma_{48}/\Gamma$
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>1.74±0.21 OUR FIT</b>					
<b>1.56±0.20±0.07</b>	157	ABLIKIM	16	BES3	$e^+ e^- \rightarrow \Lambda_c \bar{\Lambda}_c$ , 4.599 GeV

$\Gamma(\Sigma^+\omega)/\Gamma(pK^-\pi^+)$   $\Gamma_{48}/\Gamma_2$ Unseen decay modes of the  $\omega$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.274±0.032 OUR FIT</b>				
<b>0.54 ±0.13 ±0.06</b>	107	KUBOTA	93	CLE2 $e^+e^- \approx \Upsilon(4S)$

 $\Gamma(\Sigma^+K^+K^-)/\Gamma(pK^-\pi^+)$   $\Gamma_{49}/\Gamma_2$ 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.056±0.006 OUR FIT</b>				
<b>0.070±0.011±0.011</b>	59	AVERY	93	CLE2 $e^+e^- \approx 10.5$ GeV

 $\Gamma(\Sigma^+K^+K^-)/\Gamma(\Sigma^+\pi^+\pi^-)$   $\Gamma_{49}/\Gamma_{42}$ 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.078±0.008 OUR FIT</b>				
<b>0.074±0.009 OUR AVERAGE</b>				
0.076±0.007±0.009	246	ABE	02C	BELL $e^+e^- \approx \Upsilon(4S)$
0.071±0.011±0.011	103	LINK	02G	FOCS $\gamma$ nucleus, $\approx 180$ GeV

 $\Gamma(\Sigma^+\phi)/\Gamma(pK^-\pi^+)$   $\Gamma_{50}/\Gamma_2$ Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.063±0.009 OUR FIT</b>	Error includes scale factor of 1.1.			
<b>0.069±0.023±0.016</b>	26	AVERY	93	CLE2 $e^+e^- \approx 10.5$ GeV

 $\Gamma(\Sigma^+\phi)/\Gamma(\Sigma^+\pi^+\pi^-)$   $\Gamma_{50}/\Gamma_{42}$ Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.087±0.012 OUR FIT</b>				
<b>0.086±0.012 OUR AVERAGE</b>				
0.085±0.012±0.012	129	ABE	02C	BELL $e^+e^- \approx \Upsilon(4S)$
0.087±0.016±0.006	57	LINK	02G	FOCS $\gamma$ nucleus, $\approx 180$ GeV

 $\Gamma(\Xi(1690)^0K^+, \Xi^{*0} \rightarrow \Sigma^+K^-)/\Gamma(\Sigma^+\pi^+\pi^-)$   $\Gamma_{51}/\Gamma_{42}$ 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.023±0.005 OUR AVERAGE</b>				
0.023±0.005±0.005	75	ABE	02C	BELL $e^+e^- \approx \Upsilon(4S)$
0.022±0.006±0.006	34	LINK	02G	FOCS $\gamma$ nucleus, $\approx 180$ GeV

 $\Gamma(\Sigma^+K^+K^- \text{ nonresonant})/\Gamma(\Sigma^+\pi^+\pi^-)$   $\Gamma_{52}/\Gamma_{42}$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.018</b>	90	ABE	02C	BELL $e^+e^- \approx \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.028	90	LINK	02G	FOCS $\gamma$ nucleus, $\approx 180$ GeV

 $\Gamma(\Xi^0K^+)/\Gamma(pK^-\pi^+)$   $\Gamma_{53}/\Gamma_2$ 

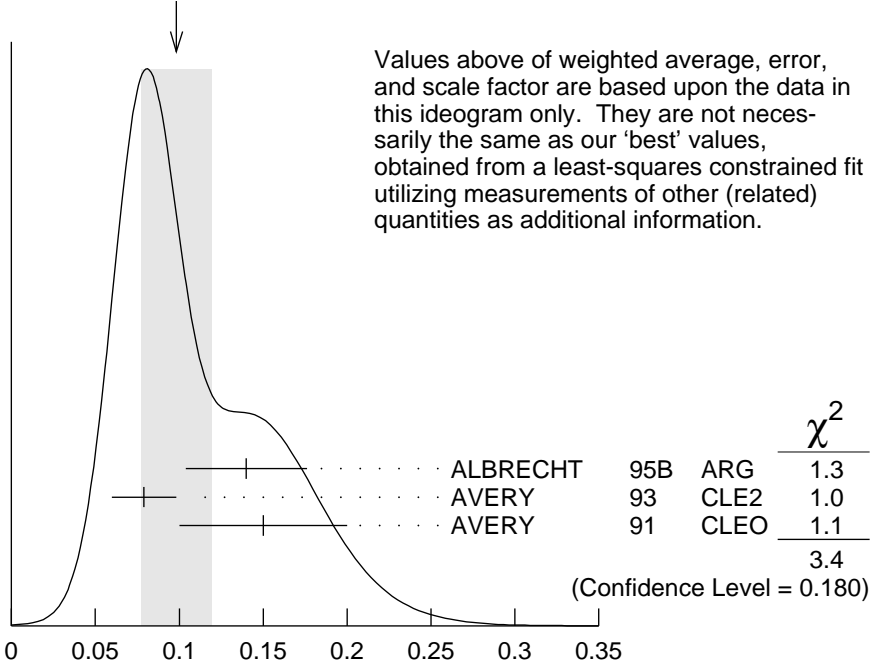
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.078±0.013±0.013</b>	56	AVERY	93	CLE2 $e^+e^- \approx 10.5$ GeV

$\Gamma(\Xi^- K^+ \pi^+)/\Gamma(p K^- \pi^+)$

$\Gamma_{54}/\Gamma_2$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.098±0.009 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.098±0.021 OUR AVERAGE</b>				Error includes scale factor of 1.3. See the ideogram below.
0.14 ±0.03 ±0.02	34	ALBRECHT	95B ARG	$e^+ e^- \approx 10.4$ GeV
0.079±0.013±0.014	60	AVERY	93 CLE2	$e^+ e^- \approx 10.5$ GeV
0.15 ±0.04 ±0.03	30	AVERY	91 CLEO	$e^+ e^- 10.5$ GeV

WEIGHTED AVERAGE  
0.098±0.021 (Error scaled by 1.3)



$\Gamma(\Xi(1530)^0 K^+)/\Gamma(p K^- \pi^+)$

$\Gamma_{55}/\Gamma_2$

Unseen decay modes of the  $\Xi(1530)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.052±0.014 OUR AVERAGE</b>				
0.05 ±0.02 ±0.01	11	ALBRECHT	95B ARG	$e^+ e^- \approx 10.4$ GeV
0.053±0.016±0.010	24	AVERY	93 CLE2	$e^+ e^- \approx 10.5$ GeV

$\Gamma(\Xi^- K^+ \pi^+)/\Gamma(\Lambda \pi^+)$

$\Gamma_{54}/\Gamma_{23}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.48 ±0.04 OUR FIT</b>				
<b>0.480±0.016±0.039</b>	2665 ± 84	AUBERT	07U BABR	$e^+ e^- \approx \gamma(4S)$

———— Hadronic modes with a hyperon: **S = 0** final states ————

$\Gamma(\Lambda K^+)/\Gamma(\Lambda \pi^+)$

$\Gamma_{56}/\Gamma_{23}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.047±0.009 OUR AVERAGE</b>				Error includes scale factor of 1.8.
0.044±0.004±0.003	1162 ± 101	AUBERT	07U BABR	$e^+ e^- \approx \gamma(4S)$
0.074±0.010±0.012	265	ABE	02C BELL	$e^+ e^- \approx \gamma(4S)$

$\Gamma(\Lambda K^+ \pi^+ \pi^-)/\Gamma(\Lambda \pi^+)$   $\Gamma_{57}/\Gamma_{23}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.1 \times 10^{-2}$	90	AUBERT	07U BABR	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Sigma^0 K^+)/\Gamma(\Sigma^0 \pi^+)$   $\Gamma_{58}/\Gamma_{39}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.040 ± 0.006 OUR AVERAGE</b>				
0.038 ± 0.005 ± 0.003	366 ± 52	AUBERT	07U BABR	$e^+ e^- \approx \Upsilon(4S)$
0.056 ± 0.014 ± 0.008	75	ABE	02C BELL	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Sigma^0 K^+ \pi^+ \pi^-)/\Gamma(\Sigma^0 \pi^+)$   $\Gamma_{59}/\Gamma_{39}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.0 \times 10^{-2}$	90	AUBERT	07U BABR	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Sigma^+ K^+ \pi^-)/\Gamma(\Sigma^+ \pi^+ \pi^-)$   $\Gamma_{60}/\Gamma_{42}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.047 ± 0.011 ± 0.008</b>	105	ABE	02C BELL	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Sigma^+ K^*(892)^0)/\Gamma(\Sigma^+ \pi^+ \pi^-)$   $\Gamma_{61}/\Gamma_{42}$

Unseen decay modes of the  $K^*(892)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.078 ± 0.018 ± 0.013</b>	49	LINK	02G FOCS	$\gamma$ nucleus, $\approx 180$ GeV

$\Gamma(\Sigma^- K^+ \pi^+)/\Gamma(\Sigma^+ K^*(892)^0)$   $\Gamma_{62}/\Gamma_{61}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.35</b>	90	LINK	02G FOCS	$\gamma$ nucleus, $\approx 180$ GeV

————— Doubly Cabibbo-suppressed modes —————

$\Gamma(\rho K^+ \pi^-)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{63}/\Gamma_2$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0046</b>	90	LINK	05K FOCS	$R = (0.05 \pm 0.26 \pm 0.02)\%$

————— Semileptonic modes —————

$\Gamma(\Lambda e^+ \nu_e)/\Gamma_{\text{total}}$   $\Gamma_{64}/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>3.63 ± 0.38 ± 0.20</b>	104	ABLIKIM	15Y BES3	$567 \text{ pb}^{-1}$ , 4.599 GeV

$\Gamma(\Lambda e^+ \nu_e)/\Gamma(\rho K^- \pi^+)$   $\Gamma_{64}/\Gamma_2$

VALUE	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.43 ± 0.08 1,2 BERGFELD 94 CLE2  $e^+ e^- \approx \Upsilon(4S)$

0.38 ± 0.14 2,3 ALBRECHT 91G ARG  $e^+ e^- \approx 10.4$  GeV

<sup>1</sup> BERGFELD 94 measures  $\sigma(e^+ e^- \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow \Lambda e^+ \nu_e) = (4.87 \pm 0.28 \pm 0.69)$  pb.

<sup>2</sup> To extract  $\Gamma(\Lambda_c^+ \rightarrow \Lambda e^+ \nu_e)/\Gamma(\Lambda_c^+ \rightarrow \rho K^- \pi^+)$ , we use  $\sigma(e^+ e^- \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow \rho K^- \pi^+) = (11.2 \pm 1.3)$  pb, which is the weighted average of measurements from ARGUS (ALBRECHT 96E) and CLEO (AVERY 91).

<sup>3</sup> ALBRECHT 91G measures  $\sigma(e^+ e^- \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow \Lambda e^+ \nu_e) = (4.20 \pm 1.28 \pm 0.71)$  pb.



$\Gamma(\Lambda\mu^+\nu_\mu)/\Gamma(pK^-\pi^+)$   $\Gamma_{65}/\Gamma_2$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.40±0.09	1,2 BERGFELD 94	CLE2	$e^+e^- \approx \mathcal{T}(4S)$
0.35±0.20	2,3 ALBRECHT 91G	ARG	$e^+e^- \approx 10.4 \text{ GeV}$

<sup>1</sup> BERGFELD 94 measures  $\sigma(e^+e^- \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow \Lambda\mu^+\nu_\mu) = (4.43 \pm 0.51 \pm 0.64) \text{ pb}$ .

<sup>2</sup> To extract  $\Gamma(\Lambda_c^+ \rightarrow \Lambda\mu^+\nu_\mu)/\Gamma(\Lambda_c^+ \rightarrow pK^-\pi^+)$ , we use  $\sigma(e^+e^- \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow pK^-\pi^+) = (11.2 \pm 1.3) \text{ pb}$ , which is the weighted average of measurements from ARGUS (ALBRECHT 96E) and CLEO (AVERY 91).

<sup>3</sup> ALBRECHT 91G measures  $\sigma(e^+e^- \rightarrow \Lambda_c^+ X) \cdot B(\Lambda_c^+ \rightarrow \Lambda\mu^+\nu_\mu) = (3.91 \pm 2.02 \pm 0.90) \text{ pb}$ .

———— Inclusive modes ————

$\Gamma(e^+ \text{ anything})/\Gamma_{\text{total}}$   $\Gamma_{66}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.045±0.017</b>	VELLA 82	MRK2	$e^+e^- 4.5\text{--}6.8 \text{ GeV}$
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$\Gamma(pe^+ \text{ anything})/\Gamma_{\text{total}}$   $\Gamma_{67}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.018±0.009</b>	<sup>1</sup> VELLA 82	MRK2	$e^+e^- 4.5\text{--}6.8 \text{ GeV}$
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<sup>1</sup>VELLA 82 includes protons from  $\Lambda$  decay.

$\Gamma(\Lambda e^+ \text{ anything})/\Gamma_{\text{total}}$   $\Gamma_{68}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.011±0.008	<sup>1</sup> VELLA 82	MRK2	$e^+e^- 4.5\text{--}6.8 \text{ GeV}$
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<sup>1</sup>VELLA 82 includes  $\Lambda$ 's from  $\Sigma^0$  decay.

$\Gamma(p \text{ anything})/\Gamma_{\text{total}}$   $\Gamma_{69}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.50±0.08±0.14</b>	<sup>1</sup> CRAWFORD 92	CLEO	$e^+e^- 10.5 \text{ GeV}$
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<sup>1</sup>This CRAWFORD 92 value includes protons from  $\Lambda$  decay. The value is model dependent, but account is taken of this in the systematic error.

$\Gamma(p \text{ anything (no } \Lambda))/\Gamma_{\text{total}}$   $\Gamma_{70}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.12±0.10±0.16</b>	CRAWFORD 92	CLEO	$e^+e^- 10.5 \text{ GeV}$
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$\Gamma(n \text{ anything})/\Gamma_{\text{total}}$   $\Gamma_{72}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.50±0.08±0.14</b>	<sup>1</sup> CRAWFORD 92	CLEO	$e^+e^- 10.5 \text{ GeV}$
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<sup>1</sup>This CRAWFORD 92 value includes neutrons from  $\Lambda$  decay. The value is model dependent, but account is taken of this in the systematic error.

$\Gamma(n \text{ anything (no } \Lambda))/\Gamma_{\text{total}}$

$\Gamma_{73}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.29±0.09±0.15</b>	CRAWFORD 92	CLEO	$e^+e^-$ 10.5 GeV

$\Gamma(p \text{ hadrons})/\Gamma_{\text{total}}$

$\Gamma_{71}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
0.41±0.24	ADAMOVICH 87	EMUL	$\gamma A$ 20–70 GeV/c

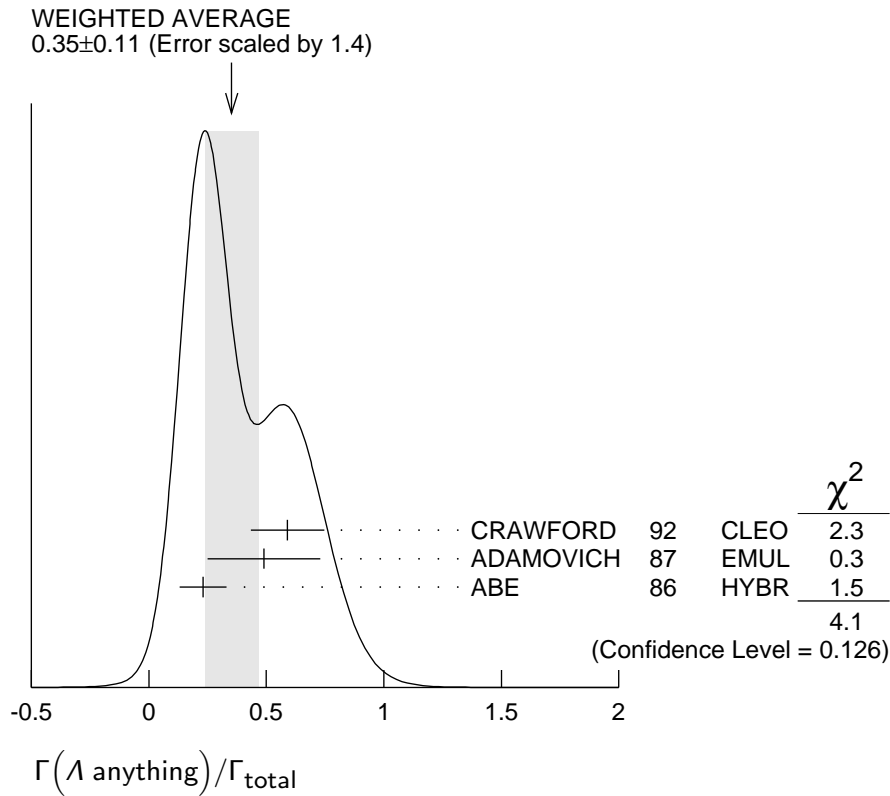
• • • We do not use the following data for averages, fits, limits, etc. • • •

$\Gamma(\Lambda \text{ anything})/\Gamma_{\text{total}}$

$\Gamma_{74}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.35±0.11 OUR AVERAGE</b>		Error includes scale factor of 1.4. See the ideogram below.		
0.59±0.10±0.12		CRAWFORD 92	CLEO	$e^+e^-$ 10.5 GeV
0.49±0.24		ADAMOVICH 87	EMUL	$\gamma A$ 20–70 GeV/c
0.23±0.10	8	<sup>1</sup> ABE 86	HYBR	20 GeV $\gamma p$

<sup>1</sup> ABE 86 includes  $\Lambda$ 's from  $\Sigma^0$  decay.



$\Gamma(\Sigma^\pm \text{ anything})/\Gamma_{\text{total}}$

$\Gamma_{75}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.1±0.05</b>	5	ABE 86	HYBR	20 GeV $\gamma p$

$\Gamma(3\text{prongs})/\Gamma_{\text{total}}$

$\Gamma_{76}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.24±0.07±0.04</b>	KAYIS-TOPAK.03	CHRS	$\nu_\mu$ emulsion, $\bar{E}=27$ GeV

————— Rare or forbidden modes —————

 $\Gamma(p e^+ e^-)/\Gamma_{\text{total}}$  $\Gamma_{77}/\Gamma$ A test for the  $\Delta C=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<5.5 \times 10^{-6}$	90	$4.0 \pm 7.1$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(p \mu^+ \mu^-)/\Gamma_{\text{total}}$  $\Gamma_{78}/\Gamma$ A test for the  $\Delta C=1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<44 \times 10^{-6}$	90	$11.1 \pm 5.6$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

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

$<3.4 \times 10^{-4}$	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV
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 $\Gamma(p e^+ \mu^-)/\Gamma_{\text{total}}$  $\Gamma_{79}/\Gamma$ 

A test of lepton family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<9.9 \times 10^{-6}$	90	$-0.7 \pm 3.0$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(p e^- \mu^+)/\Gamma_{\text{total}}$  $\Gamma_{80}/\Gamma$ 

A test of lepton family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<19 \times 10^{-6}$	90	$6.2 \pm 4.9$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\bar{p} 2e^+)/\Gamma_{\text{total}}$  $\Gamma_{81}/\Gamma$ 

A test of lepton- and baryon-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<2.7 \times 10^{-6}$	90	$-1.5 \pm 4.5$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\bar{p} 2\mu^+)/\Gamma_{\text{total}}$  $\Gamma_{82}/\Gamma$ 

A test of lepton- and baryon-number conservation and of lepton family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<9.4 \times 10^{-6}$	90	$0.0 \pm 2.2$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\bar{p} e^+ \mu^+)/\Gamma_{\text{total}}$  $\Gamma_{83}/\Gamma$ 

A test of lepton- and baryon-number conservation and of lepton family-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<16 \times 10^{-6}$	90	$10.1 \pm 6.8$	LEES	11G BABR	$e^+ e^- \approx \Upsilon(4S)$

 $\Gamma(\Sigma^- \mu^+ \mu^+)/\Gamma_{\text{total}}$  $\Gamma_{84}/\Gamma$ 

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<7.0 \times 10^{-4}$	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV

$\Lambda_c^+$  DECAY PARAMETERS

See the note on “Baryon Decay Parameters” in the neutron Listings.

 $\alpha$  FOR  $\Lambda_c^+ \rightarrow \Lambda\pi^+$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>-0.91 \pm 0.15</math> OUR AVERAGE</b>				
$-0.78 \pm 0.16 \pm 0.19$		LINK	06A	FOCS $\gamma$ A, $\bar{E}_\gamma \approx 180$ GeV
$-0.94 \pm 0.21 \pm 0.12$	414	<sup>1</sup> BISHAI	95	CLE2 $e^+e^- \approx \mathcal{T}(4S)$
$-0.96 \pm 0.42$		ALBRECHT	92	ARG $e^+e^- \approx 10.4$ GeV
$-1.1 \pm 0.4$	86	AVERY	90B	CLEO $e^+e^- \approx 10.6$ GeV

<sup>1</sup> BISHAI 95 actually gives  $\alpha = -0.94 \pm 0.21 \pm 0.12$ , chopping the errors at the physical limit  $-1.0$ . However, for  $\alpha \approx -1.0$ , some experiments should get unphysical values ( $\alpha < -1.0$ ), and for averaging with other measurements such values (or errors that extend below  $-1.0$ ) should *not* be chopped.

 $\alpha$  FOR  $\Lambda_c^+ \rightarrow \Sigma^+\pi^0$ 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>-0.45 \pm 0.31 \pm 0.06</math></b>	89	BISHAI	95	CLE2 $e^+e^- \approx \mathcal{T}(4S)$

 $\alpha$  FOR  $\Lambda_c^+ \rightarrow \Lambda\ell^+\nu_\ell$ 

The experiments don't cover the complete (or same incomplete)  $M(\Lambda\ell^+)$  range, but we average them together anyway.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>-0.86 \pm 0.04</math> OUR AVERAGE</b>				
$-0.86 \pm 0.03 \pm 0.02$	3201	<sup>1</sup> HINSON	05	CLEO $e^+e^- \approx \mathcal{T}(4S)$
$-0.91 \pm 0.42 \pm 0.25$		<sup>2</sup> ALBRECHT	94B	ARG $e^+e^- \approx 10$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.82 \pm 0.09 \pm 0.06$ $-0.06 - 0.03$	700	<sup>3</sup> CRAWFORD	95	CLE2 See HINSON 05
$-0.89 \pm 0.17 \pm 0.09$ $-0.11 - 0.05$	350	<sup>4</sup> BERGFELD	94	CLE2 See CRAWFORD 95

<sup>1</sup> HINSON 05 measures the form-factor ratio  $R \equiv f_2/f_1$  for  $\Lambda_c^+ \rightarrow \Lambda e^+ \nu_e$  events to be  $-0.31 \pm 0.05 \pm 0.04$  and the pole mass to be  $2.21 \pm 0.08 \pm 0.14$  GeV/ $c^2$ , and from these calculates  $\alpha$ , averaged over  $q^2$ , where  $\langle q^2 \rangle = 0.67$  (GeV/ $c$ )<sup>2</sup>.

<sup>2</sup> ALBRECHT 94B uses  $\Lambda e^+$  and  $\Lambda \mu^+$  events in the mass range  $1.85 < M(\Lambda\ell^+) < 2.20$  GeV.

<sup>3</sup> CRAWFORD 95 measures the form-factor ratio  $R \equiv f_2/f_1$  for  $\Lambda_c^+ \rightarrow \Lambda e^+ \nu_e$  events to be  $-0.25 \pm 0.14 \pm 0.08$  and from this calculates  $\alpha$ , averaged over  $q^2$ , to be the above.

<sup>4</sup> BERGFELD 94 uses  $\Lambda e^+$  events.

 $\Lambda_c^+, \bar{\Lambda}_c^-$  CP-VIOLATING DECAY ASYMMETRIES $(\alpha + \bar{\alpha})/(\alpha - \bar{\alpha})$  in  $\Lambda_c^+ \rightarrow \Lambda\pi^+, \bar{\Lambda}_c^- \rightarrow \bar{\Lambda}\pi^-$ 

This is zero if CP is conserved.

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>-0.07 \pm 0.19 \pm 0.24</math></b>	LINK	06A	FOCS $\gamma$ A, $\bar{E}_\gamma \approx 180$ GeV

$(\alpha + \bar{\alpha})/(\alpha - \bar{\alpha})$  in  $\Lambda_c^+ \rightarrow \Lambda e^+ \nu_e, \bar{\Lambda}_c^- \rightarrow \bar{\Lambda} e^- \bar{\nu}_e$

This is zero if *CP* is conserved.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.00±0.03±0.02</b>	HINSON	05	CLEO $e^+e^- \approx \Upsilon(4S)$

$\Lambda_c^+$  REFERENCES

We have omitted some papers that have been superseded by later experiments. The omitted papers may be found in our 1992 edition (*Physical Review D45*, 1 June, Part II) or in earlier editions.

ABLIKIM	16	PRL 116 052001	M. Ablikim <i>et al.</i>	(BES III Collab.)
ABLIKIM	15Y	PRL 115 221805	M. Ablikim <i>et al.</i>	(BES III Collab.)
ZUPANC	14	PRL 113 042002	A. Zupanc <i>et al.</i>	(BELLE Collab.)
LEES	11G	PR D84 072006	J.P. Lees <i>et al.</i>	(BABAR Collab.)
VAZQUEZ-JA...	08	PL B666 299	E. Vazquez-Jauregui <i>et al.</i>	(SELEX Collab.)
AUBERT	07U	PR D75 052002	B. Aubert <i>et al.</i>	(BABAR Collab.)
LINK	06A	PL B634 165	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
AUBERT,B	05S	PR D72 052006	B. Aubert <i>et al.</i>	(BABAR Collab.)
HINSON	05	PRL 94 191801	J.W. Hinson <i>et al.</i>	(CLEO Collab.)
LINK	05F	PL B624 22	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	05K	PL B624 166	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
CRONIN-HEN...	03	PR D67 012001	D. Cronin-Hennessy <i>et al.</i>	(CLEO Collab.)
KAYIS-TOPAK...	03	PL B555 156	A. Kayis-Topaksu <i>et al.</i>	(CERN CHORUS Collab.)
ABE	02C	PL B524 33	K. Abe <i>et al.</i>	(KEK BELLE Collab.)
LINK	02C	PRL 88 161801	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
LINK	02G	PL B540 25	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
PDG	02	PR D66 010001	K. Hagiwara <i>et al.</i>	(PDG Collab.)
KUSHNIR...	01	PRL 86 5243	A. Kushnirenko <i>et al.</i>	(FNAL SELEX Collab.)
MAHMOOD	01	PRL 86 2232	A.H. Mahmood <i>et al.</i>	(CLEO Collab.)
AITALA	00	PL B471 449	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
ALAM	98	PR D57 4467	M.S. Alam <i>et al.</i>	(CLEO Collab.)
ALBRECHT	96E	PRPL 276 223	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALEXANDER	96C	PR D53 R1013	J.P. Alexander <i>et al.</i>	(CLEO Collab.)
ALBRECHT	95B	PL B342 397	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AMMAR	95	PRL 74 3534	R. Ammar <i>et al.</i>	(CLEO Collab.)
BISHAI	95	PL B350 256	M. Bishai <i>et al.</i>	(CLEO Collab.)
CRAWFORD	95	PRL 75 624	G. Crawford <i>et al.</i>	(CLEO Collab.)
KODAMA	95	PL B345 85	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
ALBRECHT	94B	PL B326 320	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALEEV	94	PAN 57 1370	A.N. Aleev <i>et al.</i>	(Serpukhov BIS-2 Collab.)
		Translated from YF 57 1443.		
AVERY	94	PL B325 257	P. Avery <i>et al.</i>	(CLEO Collab.)
BERGFELD	94	PL B323 219	T. Bergfeld <i>et al.</i>	(CLEO Collab.)
FRABETTI	94E	PL B328 193	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
AVERY	93	PRL 71 2391	P. Avery <i>et al.</i>	(CLEO Collab.)
BOZEK	93	PL B312 247	A. Bozek <i>et al.</i>	(CERN NA32 Collab.)
FRABETTI	93D	PRL 70 1755	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	93H	PL B314 477	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
KUBOTA	93	PRL 71 3255	Y. Kubota <i>et al.</i>	(CLEO Collab.)
ALBRECHT	92	PL B274 239	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BARLAG	92	PL B283 465	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
CRAWFORD	92	PR D45 752	G. Crawford <i>et al.</i>	(CLEO Collab.)
JEZABEK	92	PL B286 175	M. Jezabek, K. Rybicki, R. Rylko	(CRAC)
ALBRECHT	91G	PL B269 234	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AVERY	91	PR D43 3599	P. Avery <i>et al.</i>	(CLEO Collab.)
ALVAREZ	90	ZPHY C47 539	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
ALVAREZ	90B	PL B246 256	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
ANJOS	90	PR D41 801	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
AVERY	90B	PRL 65 2842	P. Avery <i>et al.</i>	(CLEO Collab.)
BARLAG	90D	ZPHY C48 29	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
FRABETTI	90	PL B251 639	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
BARLAG	89	PL B218 374	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
AGUILAR...	88B	ZPHY C40 321	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
Also		PL B189 254	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
Also		PL B199 462	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
Also		SJNP 48 833	M. Begalli <i>et al.</i>	(LEBC-EHS Collab.)
		Translated from YAF 48 1310.		

ALBRECHT	88C	PL B207 109	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ANJOS	88B	PRL 60 1379	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ADAMOVICH	87	EPL 4 887	M.I. Adamovich <i>et al.</i>	(Photon Emulsion Collab.)
Also		SJNP 46 447	F. Viaggi <i>et al.</i>	(Photon Emulsion Collab.)
		Translated from YAF 46 799.		
AMENDOLIA	87	ZPHY C36 513	S.R. Amendolia <i>et al.</i>	(CERN NA1 Collab.)
JONES	87	ZPHY C36 593	G.T. Jones <i>et al.</i>	(CERN WA21 Collab.)
ABE	86	PR D33 1	K. Abe <i>et al.</i>	(SLAC HF Photon Collab.)
BOSETTI	82	PL 109B 234	P.C. Bosetti <i>et al.</i>	(AACH3, BONN, CERN+)
VELLA	82	PRL 48 1515	E. Vella <i>et al.</i>	(SLAC, LBL, UCB)
BASILE	81B	NC 62A 14	M. Basile <i>et al.</i>	(CERN, BGNA, PGIA, FRAS)
CALICCHIO	80	PL 93B 521	M. Calicchio <i>et al.</i>	(BARI, BIRM, BRUX+)

### OTHER RELATED PAPERS

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