



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

We have omitted some results that have been superseded by later experiments. See our earlier editions.

## Λ MASS

The fit uses  $\Lambda$ ,  $\Sigma^+$ ,  $\Sigma^0$ ,  $\Sigma^-$  mass and mass-difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1115.683±0.006 OUR FIT</b>				
<b>1115.683±0.006 OUR AVERAGE</b>				
1115.678±0.006±0.006	20k	HARTOUNI	94	SPEC $pp$ 27.5 GeV/c
1115.690±0.008±0.006	18k	<sup>1</sup> HARTOUNI	94	SPEC $pp$ 27.5 GeV/c
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1115.59 ±0.08	935	HYMAN	72	HEBC
1115.39 ±0.12	195	MAYEUR	67	EMUL
1115.6 ±0.4		LONDON	66	HBC
1115.65 ±0.07	488	<sup>2</sup> SCHMIDT	65	HBC
1115.44 ±0.12		<sup>3</sup> BHOWMIK	63	RVUE

<sup>1</sup>We assume *CPT* invariance: this is the  $\bar{\Lambda}$  mass as measured by HARTOUNI 94. See below for the fractional mass difference, testing *CPT*.

<sup>2</sup>The SCHMIDT 65 masses have been reevaluated using our April 1973 proton and  $K^\pm$  and  $\pi^\pm$  masses. P. Schmidt, private communication (1974).

<sup>3</sup>The mass has been raised 35 keV to take into account a 46 keV increase in the proton mass and an 11 keV decrease in the  $\pi^\pm$  mass (note added Reviews of Modern Physics **39** 1 (1967)).

$$(m_\Lambda - m_{\bar{\Lambda}}) / m_\Lambda$$

A test of *CPT* invariance.

VALUE (units $10^{-5}$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>- 0.1 ± 1.1 OUR AVERAGE</b>				Error includes scale factor of 1.6.
+ 1.3 ± 1.2	31k	<sup>1</sup> RYBICKI	96	NA32 $\pi^-$ Cu, 230 GeV
- 1.08 ± 0.90		HARTOUNI	94	SPEC $pp$ 27.5 GeV/c
4.5 ± 5.4		CHIEN	66	HBC 6.9 GeV/c $\bar{p}p$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
-26 ±13		BADIER	67	HBC 2.4 GeV/c $\bar{p}p$

<sup>1</sup>RYBICKI 96 is an analysis of old ACCMOR (NA32) data.

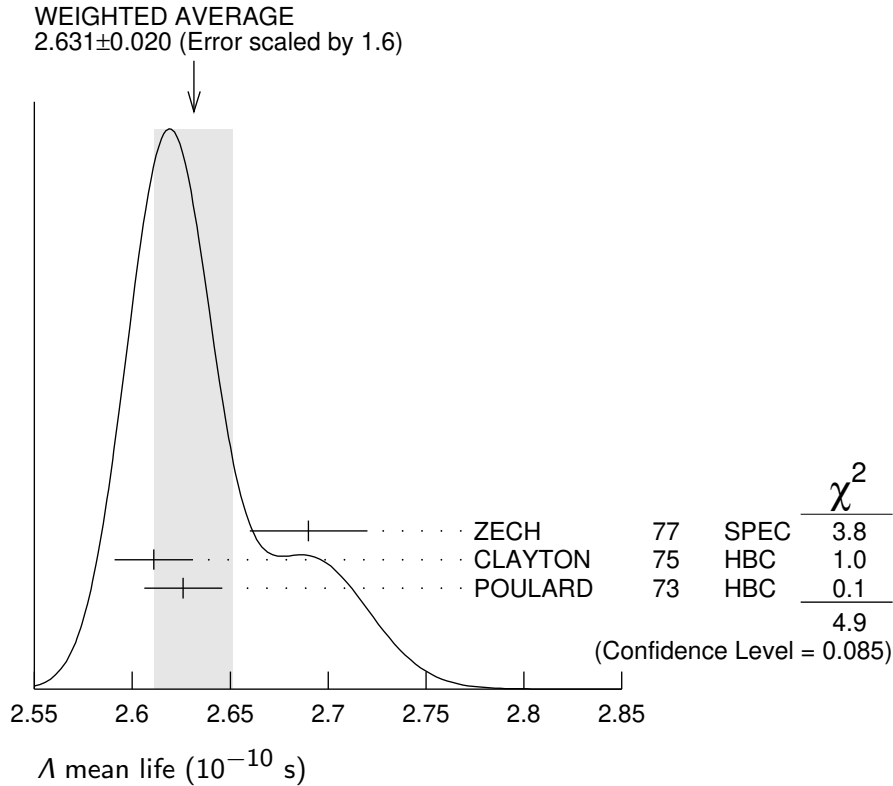
## Λ MEAN LIFE

Measurements with an error  $\geq 0.1 \times 10^{-10}$  s have been omitted altogether, and only the latest high-statistics measurements are used for the average.

VALUE ( $10^{-10}$ s)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.632±0.020 OUR AVERAGE</b>				Error includes scale factor of 1.6. See the ideogram below.
2.69 ±0.03	53k	ZECH	77	SPEC Neutral hyperon beam
2.611±0.020	34k	CLAYTON	75	HBC 0.96–1.4 GeV/c $K^- p$
2.626±0.020	36k	POULARD	73	HBC 0.4–2.3 GeV/c $K^- p$

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

$2.69 \pm 0.05$	6582	ALTHOFF	73B	OSPK	$\pi^+ n \rightarrow \Lambda K^+$
$2.54 \pm 0.04$	4572	BALTAY	71B	HBC	$K^- p$ at rest
$2.535 \pm 0.035$	8342	GRIMM	68	HBC	
$2.47 \pm 0.08$	2600	HEPP	68	HBC	
$2.35 \pm 0.09$	916	BURAN	66	HLBC	
$2.452^{+0.056}_{-0.054}$	2213	ENGELMANN	66	HBC	
$2.59 \pm 0.09$	794	HUBBARD	64	HBC	
$2.59 \pm 0.07$	1378	SCHWARTZ	64	HBC	
$2.36 \pm 0.06$	2239	BLOCK	63	HEBC	



$$(\tau_\Lambda - \tau_{\bar{\Lambda}}) / \tau_\Lambda$$

A test of *CPT* invariance.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>-0.001 \pm 0.009</math> OUR AVERAGE</b>			
$-0.0018 \pm 0.0066 \pm 0.0056$	BARNES	96	CNTR LEAR $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$
$0.044 \pm 0.085$	BADIER	67	HBC 2.4 GeV/c $\bar{p}p$

### $\Lambda$ MAGNETIC MOMENT

See the “Quark Model” review. Measurements with an error  $\geq 0.15 \mu_N$  have been omitted.

VALUE ( $\mu_N$ )	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.613 ± 0.004</b>				<b>OUR AVERAGE</b>
-0.606 ± 0.015	200k	COX	81	SPEC
-0.6138 ± 0.0047	3M	SCHACHIN...	78	SPEC
-0.59 ± 0.07	350k	HELLER	77	SPEC
-0.57 ± 0.05	1.2M	BUNCE	76	SPEC
-0.66 ± 0.07	1300	DAHL-JENSEN71	EMUL	200 kG field

## Λ ELECTRIC DIPOLE MOMENT

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

VALUE ( $10^{-16}$ ecm)	CL%	DOCUMENT ID	TECN
<b>&lt; 1.5</b>	95	<sup>1</sup> PONDROM	81 SPEC
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
<100	95	<sup>2</sup> BARONI	71 EMUL
<500	95	GIBSON	66 EMUL
<sup>1</sup> PONDROM 81 measures $(-3.0 \pm 7.4) \times 10^{-17}$ e-cm.			
<sup>2</sup> BARONI 71 measures $(-5.9 \pm 2.9) \times 10^{-15}$ e-cm.			

## Λ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Confidence level
$\Gamma_1$ $p\pi^-$	(63.9 ± 0.5) %	
$\Gamma_2$ $n\pi^0$	(35.8 ± 0.5) %	
$\Gamma_3$ $n\gamma$	$(1.75 \pm 0.15) \times 10^{-3}$	
$\Gamma_4$ $p\pi^- \gamma$	[a] $(8.4 \pm 1.4) \times 10^{-4}$	
$\Gamma_5$ $p e^- \bar{\nu}_e$	$(8.32 \pm 0.14) \times 10^{-4}$	
$\Gamma_6$ $p \mu^- \bar{\nu}_\mu$	$(1.57 \pm 0.35) \times 10^{-4}$	

### Lepton ( $L$ ) and/or Baryon ( $B$ ) number violating decay modes

$\Gamma_7$ $\pi^+ e^-$	$L, B$	< 6	$\times 10^{-7}$	90%
$\Gamma_8$ $\pi^+ \mu^-$	$L, B$	< 6	$\times 10^{-7}$	90%
$\Gamma_9$ $\pi^- e^+$	$L, B$	< 4	$\times 10^{-7}$	90%
$\Gamma_{10}$ $\pi^- \mu^+$	$L, B$	< 6	$\times 10^{-7}$	90%
$\Gamma_{11}$ $K^+ e^-$	$L, B$	< 2	$\times 10^{-6}$	90%
$\Gamma_{12}$ $K^+ \mu^-$	$L, B$	< 3	$\times 10^{-6}$	90%
$\Gamma_{13}$ $K^- e^+$	$L, B$	< 2	$\times 10^{-6}$	90%
$\Gamma_{14}$ $K^- \mu^+$	$L, B$	< 3	$\times 10^{-6}$	90%
$\Gamma_{15}$ $K_S^0 \nu$	$L, B$	< 2	$\times 10^{-5}$	90%
$\Gamma_{16}$ $\bar{p}\pi^+$	$B$	< 9	$\times 10^{-7}$	90%

[a] See the Listings below for the pion momentum range used in this measurement.

**CONSTRAINED FIT INFORMATION**

An overall fit to 5 branching ratios uses 20 measurements and one constraint to determine 5 parameters. The overall fit has a  $\chi^2 = 10.5$  for 16 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.

$x_2$	-100			
$x_3$	-2	-1		
$x_5$	46	-46	-1	
$x_6$	0	0	0	0
	$x_1$	$x_2$	$x_3$	$x_5$

 **$\Lambda$  BRANCHING RATIOS** **$\Gamma(p\pi^-) / \Gamma(N\pi)$**  **$\Gamma_1 / (\Gamma_1 + \Gamma_2)$** 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.641 ± 0.005 OUR FIT</b>				
<b>0.640 ± 0.005 OUR AVERAGE</b>				
0.646 ± 0.008	4572	BALTAY	71B HBC	$K^- p$ at rest
0.635 ± 0.007	6736	DOYLE	69 HBC	$\pi^- p \rightarrow \Lambda K^0$
0.643 ± 0.016	903	HUMPHREY	62 HBC	
0.624 ± 0.030		CRAWFORD	59B HBC	$\pi^- p \rightarrow \Lambda K^0$

 **$\Gamma(n\pi^0) / \Gamma(N\pi)$**  **$\Gamma_2 / (\Gamma_1 + \Gamma_2)$** 

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
<b>0.359 ± 0.005 OUR FIT</b>			
<b>0.310 ± 0.028 OUR AVERAGE</b>			
0.35 ± 0.05		BROWN	63 HLBC
0.291 ± 0.034	75	CHRETIEN	63 HLBC

 **$\Gamma(n\gamma) / \Gamma_{\text{total}}$**  **$\Gamma_3 / \Gamma$** 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.75 ± 0.15 OUR FIT</b>				
<b>1.75 ± 0.15</b>	1816	LARSON	93 SPEC	$K^- p$ at rest
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1.78 ± 0.24 <sup>+0.14</sup> / <sub>-0.16</sub>	287	NOBLE	92 SPEC	See LARSON 93

 **$\Gamma(n\gamma) / \Gamma(n\pi^0)$**  **$\Gamma_3 / \Gamma_2$** 

<u>VALUE (units <math>10^{-3}</math>)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
2.86 ± 0.74 ± 0.57	24	BIAGI	86 SPEC	SPS hyperon beam

$\Gamma(p\pi^-\gamma)/\Gamma(p\pi^-)$					$\Gamma_4/\Gamma_1$
VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>1.32±0.22</b>	72	BAGGETT	72C	HBC	$\pi^- < 95 \text{ MeV}/c$

$\Gamma(pe^-\bar{\nu}_e)/\Gamma(p\pi^-)$					$\Gamma_5/\Gamma_1$
VALUE (units $10^{-3}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>1.301±0.019 OUR FIT</b>					
<b>1.301±0.019 OUR AVERAGE</b>					
1.335±0.056	7111	BOURQUIN	83	SPEC	SPS hyperon beam
1.313±0.024	10k	WISE	80	SPEC	
1.23 ±0.11	544	LINDQUIST	77	SPEC	$\pi^- p \rightarrow K^0 \Lambda$
1.27 ±0.07	1089	KATZ	73	HBC	
1.31 ±0.06	1078	ALTHOFF	71	OSPK	
1.17 ±0.13	86	<sup>1</sup> CANTER	71	HBC	$K^- p$ at rest
1.20 ±0.12	143	<sup>2</sup> MALONEY	69	HBC	
1.17 ±0.18	120	<sup>2</sup> BAGLIN	64	FBC	$K^-$ freon 1.45 GeV/c
1.23 ±0.20	150	<sup>2</sup> ELY	63	FBC	

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

1.32 ±0.15      218      <sup>1</sup>LINDQUIST    71    OSPK    See LINDQUIST 77

<sup>1</sup> Changed by us from  $\Gamma(pe^-\bar{\nu}_e)/\Gamma(N\pi)$  assuming the authors used  $\Gamma(\Lambda \rightarrow p\pi^-)/\Gamma(\text{total}) = 2/3$ .

<sup>2</sup> Changed by us from  $\Gamma(pe^-\bar{\nu}_e)/\Gamma(N\pi)$  because  $\Gamma(pe^-\nu)/\Gamma(p\pi^-)$  is the directly measured quantity.

$\Gamma(p\mu^-\bar{\nu}_\mu)/\Gamma_{\text{total}}$					$\Gamma_6/\Gamma$
VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>1.48±0.21±0.08</b>	64	<sup>1</sup> ABLIKIM	21AG	BES3	$J/\psi \rightarrow \Lambda \bar{\Lambda}$

<sup>1</sup> ABLIKIM 21AG use  $\bar{\Lambda} \rightarrow \bar{p}\pi^+$  decay mode as the double tag identifier and thus as indirect normalization.

$\Gamma(p\mu^-\bar{\nu}_\mu)/\Gamma(N\pi)$					$\Gamma_6/(\Gamma_1+\Gamma_2)$
VALUE (units $10^{-4}$ )	EVTS	DOCUMENT ID	TECN	COMMENT	
<b>1.57±0.35 OUR FIT</b>					
<b>1.57±0.35 OUR AVERAGE</b>					
1.4 ±0.5	14	BAGGETT	72B	HBC	$K^- p$ at rest
2.4 ±0.8	9	CANTER	71B	HBC	$K^- p$ at rest
1.3 ±0.7	3	LIND	64	RVUE	
1.5 ±1.2	2	RONNE	64	FBC	

### Lepton (L) and/or Baryon (B) number violating decay modes

$\Gamma(\pi^+ e^-)/\Gamma_{\text{total}}$					$\Gamma_7/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<b>&lt;6 × 10<sup>-7</sup></b>	90	<sup>1</sup> MCCRACKEN	15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode.

$\Gamma(\pi^+ \mu^-)/\Gamma_{\text{total}}$					$\Gamma_8/\Gamma$
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<b>&lt;6 × 10<sup>-7</sup></b>	90	<sup>1</sup> MCCRACKEN	15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode.

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

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<4 \times 10^{-7}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(\pi^- \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{10}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<6 \times 10^{-7}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(K^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_{11}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<2 \times 10^{-6}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(K^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{12}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3 \times 10^{-6}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(K^- e^+)/\Gamma_{\text{total}}$   $\Gamma_{13}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<2 \times 10^{-6}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(K^- \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{14}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3 \times 10^{-6}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(K_S^0 \nu)/\Gamma_{\text{total}}$   $\Gamma_{15}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<2 \times 10^{-5}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode. $\Gamma(\bar{p}\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{16}/\Gamma$ 

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<9 \times 10^{-7}$	90	<sup>1</sup> MCCRACKEN 15	CLAS	$\gamma p \rightarrow K^+ \Lambda$

<sup>1</sup> Uses  $B(\Lambda \rightarrow p\pi^-) = (63.9 \pm 0.5)\%$  for normalization mode.

**$\Lambda$  CP-violating decay-rate asymmetries**

This is the difference between  $\Lambda$  and  $\bar{\Lambda}$  decay rates to state  $f$  and  $\bar{f}$  divided by the sum of the rates:

$$A_{CP}(f) = [(B(\Lambda \rightarrow f)) - (B(\bar{\Lambda} \rightarrow \bar{f}))]/\text{Sum}.$$

 **$A_{CP}(\rho\mu^-\bar{\nu}_\mu)$  in  $\Lambda \rightarrow \rho\mu^-\bar{\nu}_\mu, \bar{\Lambda} \rightarrow \bar{\rho}\mu^+\nu_\mu$** 

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.02±0.14±0.02</b>	ABLIKIM	21AG BES3	$J/\psi \rightarrow \Lambda\bar{\Lambda}$

 **$\Lambda$  DECAY PARAMETERS**

See the “Note on Baryon Decay Parameters” in the neutron Listings. Some early results have been omitted.

 **$\alpha_-$  FOR  $\Lambda \rightarrow p\pi^-$** 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.732±0.014 OUR AVERAGE</b>		Error includes scale factor of 2.3.		
0.750±0.009±0.004	420k	ABLIKIM	19BJ BES3	$J/\psi$ to $\Lambda\bar{\Lambda}$
0.721±0.006±0.005		<sup>1</sup> IRELAND	19 CLAS	$K$ production
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.74 <sup>+0.04</sup> <sub>-0.03</sub>		AAIJ	200 LHCb	$\Lambda_b \rightarrow J/\psi\Lambda$
0.584±0.046	8500	ASTBURY	75 SPEC	
0.649±0.023	10325	CLELAND	72 OSPK	
0.67 ±0.06	3520	DAUBER	69 HBC	From $\Xi$ decay
0.645±0.017	10130	OVERSETH	67 OSPK	$\Lambda$ from $\pi^- p$
0.62 ±0.07	1156	CRONIN	63 CNTR	$\Lambda$ from $\pi^- p$

<sup>1</sup> This is a new analysis based on existing kaon photoproduction data of the CLAS collaboration and using spin algebra constraints.

 **$\alpha_+$  FOR  $\bar{\Lambda} \rightarrow \bar{p}\pi^+$** 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.758±0.010±0.007</b>	420k	ABLIKIM	19BJ BES3	$J/\psi$ to $\Lambda\bar{\Lambda}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.755±0.083±0.063	≈ 8.7k	ABLIKIM	10 BES	$J/\psi \rightarrow \Lambda\bar{\Lambda}$
-0.63 ±0.13	770	TIXIER	88 DM2	$J/\psi \rightarrow \Lambda\bar{\Lambda}$

 **$\bar{\alpha}_0$  FOR  $\bar{\Lambda} \rightarrow \bar{n}\pi^0$** 

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.692±0.016±0.006</b>	47k	ABLIKIM	19BJ BES3	$J/\psi$ to $\Lambda\bar{\Lambda}$

 **$\phi$  ANGLE FOR  $\Lambda \rightarrow p\pi^-$** 

**$(\tan\phi = \beta / \gamma)$**

VALUE (°)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>- 6.5± 3.5 OUR AVERAGE</b>				
- 7.0± 4.5	10325	CLELAND	72 OSPK	$\Lambda$ from $\pi^- p$
- 8.0± 6.0	10130	OVERSETH	67 OSPK	$\Lambda$ from $\pi^- p$
13.0±17.0	1156	CRONIN	63 OSPK	$\Lambda$ from $\pi^- p$

$$\alpha_0 / \alpha_- = \alpha(\Lambda \rightarrow n\pi^0) / \alpha(\Lambda \rightarrow p\pi^-)$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.01 ± 0.07 OUR AVERAGE</b>				
1.000 ± 0.068	4760	<sup>1</sup> OLSEN	70 OSPK	$\pi^+ n \rightarrow \Lambda K^+$
1.10 ± 0.27		CORK	60 CNTR	

<sup>1</sup> OLSEN 70 compares proton and neutron distributions from  $\Lambda$  decay.

$$\bar{\alpha}_0 / \alpha_+ \text{ in } \bar{\Lambda} \rightarrow \bar{n}\pi^0, \bar{\Lambda} \rightarrow \bar{p}\pi^+$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.913 ± 0.028 ± 0.012</b>	47k	ABLIKIM	19BJ BES3	$J/\psi$ to $\Lambda\bar{\Lambda}$

$$(\alpha + \bar{\alpha}) / (\alpha - \bar{\alpha}) \text{ in } \Lambda \rightarrow p\pi^-, \bar{\Lambda} \rightarrow \bar{p}\pi^+$$

Zero if  $CP$  is conserved;  $\alpha_-$  and  $\alpha_+$  are the asymmetry parameters for  $\Lambda \rightarrow p\pi^-$  and  $\bar{\Lambda} \rightarrow \bar{p}\pi^+$  decay. See also the  $\Xi^-$  for a similar test involving the decay chain  $\Xi^- \rightarrow \Lambda\pi^-, \Lambda \rightarrow p\pi^-$  and the corresponding antiparticle chain.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.002 ± 0.012 OUR AVERAGE</b>				
-0.006 ± 0.012 ± 0.007	420k	ABLIKIM	19BJ BES3	$J/\psi$ to $\Lambda\bar{\Lambda}$
-0.081 ± 0.055 ± 0.059	≈ 8.7k	ABLIKIM	10 BES	$J/\psi \rightarrow \Lambda\bar{\Lambda}$
+0.013 ± 0.022	96k	BARNES	96 CNTR	LEAR $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$
+0.01 ± 0.10	770	TIXIER	88 DM2	$J/\psi \rightarrow \Lambda\bar{\Lambda}$
-0.02 ± 0.14	10k	<sup>1</sup> CHAUVAT	85 CNTR	$pp, \bar{p}p$ ISR

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

-0.07 ± 0.09      4063      BARNES      87      CNTR      See BARNES 96

<sup>1</sup> CHAUVAT 85 actually gives  $\alpha_+(\bar{\Lambda})/\alpha_-(\Lambda) = -1.04 \pm 0.29$ . Assumes polarization is same in  $\bar{p}p \rightarrow \bar{\Lambda}X$  and  $pp \rightarrow \Lambda X$ . Tests of this assumption, based on  $C$ -invariance and fragmentation, are satisfied by the data.

$$R = |G_E/G_M| \text{ in } \Lambda \rightarrow p\pi^-, \bar{\Lambda} \rightarrow \bar{p}\pi^+$$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.96 ± 0.14 ± 0.02</b>	<sup>1</sup> ABLIKIM	19BF BES3	$e^+e^- \rightarrow \bar{\Lambda}\Lambda$ at $\sqrt{s} = 2.396$ GeV

<sup>1</sup> Determined using the latest BES-III value on the asymmetry parameter  $\alpha = 0.750 \pm 0.010$ .

$$\Delta\Phi = \Phi_E - \Phi_M \text{ in } \Lambda \rightarrow p\pi^-, \bar{\Lambda} \rightarrow \bar{p}\pi^+$$

VALUE (degrees)	DOCUMENT ID	TECN	COMMENT
<b>37 ± 12 ± 6</b>	<sup>1</sup> ABLIKIM	19BF BES3	$e^+e^- \rightarrow \bar{\Lambda}\Lambda$ at $\sqrt{s} = 2.396$ GeV

<sup>1</sup> Relative phase between  $G_E$  and  $G_M$ , determined using the latest BES-III value on the asymmetry parameter  $\alpha = 0.750 \pm 0.010$ .

$$g_A / g_V \text{ FOR } \Lambda \rightarrow p e^- \bar{\nu}_e$$

Measurements with fewer than 500 events have been omitted. Where necessary, signs have been changed to agree with our conventions, which are given in the "Note on Baryon Decay Parameters" in the neutron Listings. The measurements all assume that the form factor  $g_2 = 0$ . See also the footnote on DWORKIN 90.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.718 ± 0.015 OUR AVERAGE</b>				
-0.719 ± 0.016 ± 0.012	37k	<sup>1</sup> DWORKIN	90 SPEC	$e\nu$ angular corr.
-0.70 ± 0.03	7111	BOURQUIN	83 SPEC	$\Xi \rightarrow \Lambda\pi^-$
-0.734 ± 0.031	10k	<sup>2</sup> WISE	81 SPEC	$e\nu$ angular correl.



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

−0.63 ± 0.06                    817            ALTHOFF            73    OSPK    Polarized  $\Lambda$

<sup>1</sup> The tabulated result assumes the weak-magnetism coupling  $w \equiv g_W(0)/g_V(0)$  to be 0.97, as given by the CVC hypothesis and as assumed by the other listed measurements. However, DWORKIN 90 *measures*  $w$  to be  $0.15 \pm 0.30$ , and then  $g_A/g_V = -0.731 \pm 0.016$ .

<sup>2</sup> This experiment measures only the absolute value of  $g_A/g_V$ .

## REFERENCES

We have omitted some papers that have been superseded by later experiments. See our earlier editions.

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AAIJ	20O	JHEP 2006 110	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	19BF	PRL 123 122003	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	19BJ	NATP 15 631	M. Ablikim <i>et al.</i>	(BESIII Collab.)
IRELAND	19	PRL 123 182301	D.G. Ireland <i>et al.</i>	(GLAS, GWU, JULI+)
MCCRACKEN	15	PR D92 072002	M.E. McCracken <i>et al.</i>	(JLab CLAS Collab.)
ABLIKIM	10	PR D81 012003	M. Ablikim <i>et al.</i>	(BES Collab.)
BARNES	96	PR C54 1877	P.D. Barnes <i>et al.</i>	(CERN PS-185 Collab.)
RYBICKI	96	APP B27 2155	K. Rybicki	
HARTOUNI	94	PRL 72 1322	E.P. Hartouni <i>et al.</i>	(BNL E766 Collab.)
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