NODE=S018

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

We have omitted some results that have been superseded by later experiments.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

NODE=S018

Λ MASS

NODE=S018M

The fit uses Λ, Σ^+, Σ^0, Σ^- mass and mass-difference measurements.

NODE=S018M

NODE=S018M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1115.683±0.006 OUR FIT					
1115.683±0.006 OUR AVERAGE					
1115.678±0.006±0.006	20k	HARTOUNI	94	SPEC	pp 27.5 GeV/c
1115.690±0.008±0.006	18k	[1] 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	[2] SCHMIDT	65	HBC	
1115.44 ±0.12		[3] BHOWMIK	63	RVUE	

OCCUR=2

[1] We assume CPT invariance: this is the $\overline{\Lambda}$ mass as measured by HARTOUNI 94. See below for the fractional mass difference, testing CPT.

NODE=S018M;LINKAGE=C

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

NODE=S018M;LINKAGE=A

[3] 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)).

NODE=S018M;LINKAGE=L

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

NODE=S018DM

A test of CPT invariance.

NODE=S018DM

NODE=S018DM

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN	COMMENT
− 0.1 ± 1.1 OUR AVERAGE	Error includes scale factor of 1.6.				
+ 1.3 ± 1.2	31k	[1] RYBICKI	96	NA32	π^- 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 $\overline{p}p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−26 ±13		BADIER	67	HBC	2.4 GeV/c $\overline{p}p$

[1] RYBICKI 96 is an analysis of old ACCMOR (NA32) data.

NODE=S018DM;LINKAGE=RY

Λ MEAN LIFE

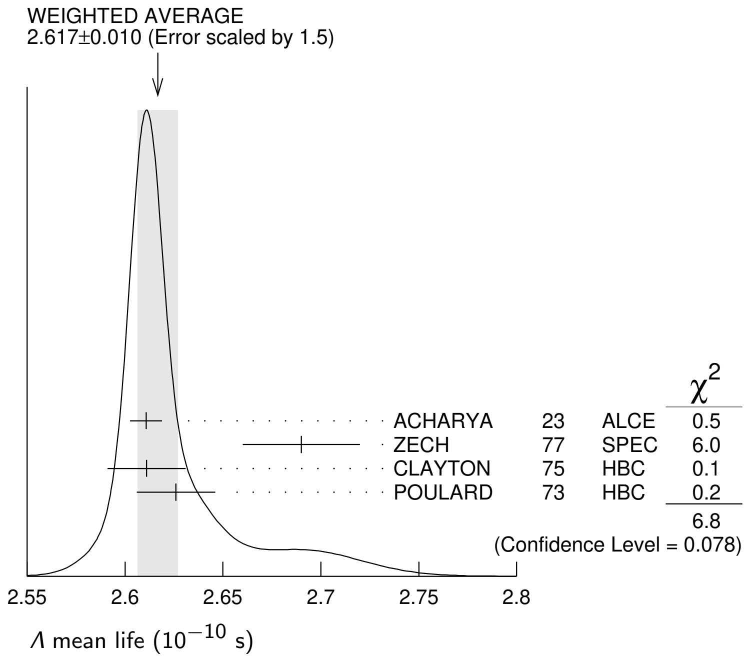
NODE=S018T

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

NODE=S018T

NODE=S018T

VALUE (10^{-10} s)	EVTS	DOCUMENT ID		TECN	COMMENT
2.617 ±0.010 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below.				
2.6107±0.0037±0.0072	188M	ACHARYA	23	ALCE	Pb-Pb → ΛX or $\overline{\Lambda}X$ at 5.02 TeV
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 ±0.05	6582	ALTHOFF	73B	OSPK	$\pi^+ n \rightarrow \Lambda K^+$
2.54 ±0.04	4572	BALTAY	71B	HBC	$K^- p$ at rest
2.535 ±0.035	8342	GRIMM	68	HBC	
2.47 ±0.08	2600	HEPP	68	HBC	
2.35 ±0.09	916	BURAN	66	HLBC	
2.452 $^{+0.056}_{-0.054}$	2213	ENGELMANN	66	HBC	
2.59 ±0.09	794	HUBBARD	64	HBC	
2.59 ±0.07	1378	SCHWARTZ	64	HBC	
2.36 ±0.06	2239	BLOCK	63	HEBC	



$(\tau_{\Lambda} - \tau_{\overline{\Lambda}}) / \tau_{\Lambda}$ NODE=S018DT

A test of *CPT* invariance. NODE=S018DT

NODE=S018DT

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.9± 3.2 OUR AVERAGE					
1.3± 2.8±2.1	188M	ACHARYA	23	ALCE	Pb-Pb → ΛX or $\overline{\Lambda} X$ at 5.02 TeV
− 1.8± 6.6±5.6		BARNES	96	CNTR	LEAR $\overline{p}p \rightarrow \overline{\Lambda}\Lambda$
44 ±85		BADIER	67	HBC	2.4 GeV/c $\overline{p}p$

Λ MAGNETIC MOMENT NODE=S018MM

See the "Quark Model" review. Measurements with an error $\geq 0.15\ \mu_N$ have been omitted. NODE=S018MM

NODE=S018MM

VALUE (μ_N)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.613 ±0.004 OUR AVERAGE					
−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-JENSEN	71	EMUL	200 kG field

Λ ELECTRIC DIPOLE MOMENT NODE=S018EDM

A nonzero value is forbidden by both *T* invariance and *P* invariance. NODE=S018EDM

NODE=S018EDM

VALUE (10^{-16} *e* cm)	*CL%*	*DOCUMENT ID*		*TECN*
< 1.5	95	[1] PONDROM	81	SPEC
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<100	95	[2] BARONI	71	EMUL
<500	95	GIBSON	66	EMUL

[1] PONDROM 81 measures $(-3.0 \pm 7.4) \times 10^{-17}$ *e*-cm. NODE=S018EDM;LINKAGE=P
[2] BARONI 71 measures $(-5.9 \pm 2.9) \times 10^{-15}$ *e*-cm. NODE=S018EDM;LINKAGE=B

Λ DECAY MODES NODE=S018235;NODE=S018

	Mode		Fraction (Γ_i/Γ)	Confidence level	
Γ_1	$p\pi^-$		(64.1 ±0.5) %		DESIG=1
Γ_2	$n\pi^0$		(35.9 ±0.5) %		DESIG=2
Γ_3	$n\gamma$		(8.3 ±0.7) × 10^{-4}		DESIG=6
Γ_4	$p\pi^-\gamma$	[a]	(8.5 ±1.4) × 10^{-4}		DESIG=5
Γ_5	$pe^-\overline{\nu}_e$		(8.34±0.14) × 10^{-4}		DESIG=4
Γ_6	$p\mu^-\overline{\nu}_\mu$		(1.51±0.19) × 10^{-4}		DESIG=3

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

NODE=S018;CLUMP=A

Γ_7	$\pi^+ e^-$	L,B	$<$	6	$\times 10^{-7}$	90%	DESIG=7
Γ_8	$\pi^+ \mu^-$	L,B	$<$	6	$\times 10^{-7}$	90%	DESIG=8
Γ_9	$\pi^- e^+$	L,B	$<$	4	$\times 10^{-7}$	90%	DESIG=9
Γ_{10}	$\pi^- \mu^+$	L,B	$<$	6	$\times 10^{-7}$	90%	DESIG=10
Γ_{11}	$K^+ e^-$	L,B	$<$	2	$\times 10^{-6}$	90%	DESIG=11
Γ_{12}	$K^+ \mu^-$	L,B	$<$	3	$\times 10^{-6}$	90%	DESIG=12
Γ_{13}	$K^- e^+$	L,B	$<$	2	$\times 10^{-6}$	90%	DESIG=13
Γ_{14}	$K^- \mu^+$	L,B	$<$	3	$\times 10^{-6}$	90%	DESIG=14
Γ_{15}	$K^0_S \nu$	L,B	$<$	2	$\times 10^{-5}$	90%	DESIG=15
Γ_{16}	$\overline{p}\pi^+$	B	$<$	9	$\times 10^{-7}$	90%	DESIG=16
Γ_{17}	invisible		$<$	7.4	$\times 10^{-5}$	90%	DESIG=103

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

CONSTRAINED FIT INFORMATION

An overall fit to 4 branching ratios uses 11 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 =$ 6.9 for 9 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_2	−100	
x_6	0	0
	x_1	x_2

Λ BRANCHING RATIOS

NODE=S018240

$\Gamma(p\pi^-)/\Gamma(N\pi)$ — $\Gamma_1/(\Gamma_1+\Gamma_2)$

NODE=S018R1

NODE=S018R1

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.641±0.005 OUR FIT					
0.640±0.005 OUR AVERAGE					
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	$\pi^- p \rightarrow \Lambda K^0$

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

NODE=S018R2

NODE=S018R2

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*
0.359±0.005 OUR FIT				
0.310±0.028 OUR AVERAGE				
0.35 ±0.05		BROWN	63	HLBC
0.291±0.034	75	CHRETIEN	63	HLBC

$\Gamma(n\gamma)/\Gamma_{\text{total}}$ — Γ_3/Γ

NODE=S018R8

NODE=S018R8

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.832±0.038±0.054	1221	[1] ABLIKIM	22AJ	BES3	$J/\psi \rightarrow \Lambda\overline{\Lambda}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.75 ±0.15	1816	LARSON	93	SPEC	$K^- p$ at rest
1.78 ±0.24 $^{+0.14}_{-0.16}$	287	NOBLE	92	SPEC	See LARSON 93

[1] This ABLIKIM 22AJ value is a factor of 2.1 smaller and differs by 5.6σ from the previous LARSON 93 value. NODE=S018R8;LINKAGE=A

$\Gamma(n\gamma)/\Gamma(n\pi^0)$ — Γ_3/Γ_2

NODE=S018R7

NODE=S018R7

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • 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

$\Gamma(p\pi^-\gamma)/\Gamma(p\pi^-)$ Γ_4/Γ_1

NODE=S018R6
NODE=S018R6

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.32±0.22	72	BAGGETT	72C	HBC	π^- < 95 MeV/c

$\Gamma(pe^-\overline{\nu}_e)/\Gamma(p\pi^-)$ Γ_5/Γ_1

NODE=S018R5
NODE=S018R5

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.301±0.019 OUR AVERAGE					
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	$\pi^- p \to K^0 \Lambda$
1.27 ±0.07	1089	KATZ	73	HBC	
1.31 ±0.06	1078	ALTHOFF	71	OSPK	
1.17 ±0.13	86	[1] CANTER	71	HBC	$K^- p$ at rest
1.20 ±0.12	143	[2] MALONEY	69	HBC	
1.17 ±0.18	120	[2] BAGLIN	64	FBC	K^- freon 1.45 GeV/c
1.23 ±0.20	150	[2] ELY	63	FBC	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.32 ±0.15	218	[1] LINDQUIST	71	OSPK	See LINDQUIST 77

[1] Changed by us from $\Gamma(pe^-\overline{\nu}_e)/\Gamma(N\pi)$ assuming the authors used $\Gamma(\Lambda \to p\pi^-)/\Gamma(\text{total}) = 2/3$. NODE=S018R5;LINKAGE=C

[2] Changed by us from $\Gamma(pe^-\overline{\nu}_e)/\Gamma(N\pi)$ because $\Gamma(pe^-\nu)/\Gamma(p\pi^-)$ is the directly measured quantity. NODE=S018R5;LINKAGE=D

$\Gamma(p\mu^-\overline{\nu}_\mu)/\Gamma_{\text{total}}$ Γ_6/Γ

NODE=S018R00
NODE=S018R00

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.51±0.19 OUR FIT					
1.48±0.21±0.08	64	[1] ABLIKIM	21AG	BES3	$J/\psi \to \Lambda\overline{\Lambda}$

[1] ABLIKIM 21AG use $\overline{\Lambda} \to \overline{p}\pi^+$ decay mode as the double tag identifier and thus as indirect normalization. NODE=S018R00;LINKAGE=A

$\Gamma(p\mu^-\overline{\nu}_\mu)/\Gamma(N\pi)$ $\Gamma_6/(\Gamma_1+\Gamma_2)$

NODE=S018R4
NODE=S018R4

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.51±0.19 OUR FIT					
1.57±0.35 OUR AVERAGE					
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	OCCUR=2
1.5 ±1.2	2	RONNE	64	FBC	

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

NODE=S018250

$\Gamma(\pi^+e^-)/\Gamma_{\text{total}}$ Γ_7/Γ

NODE=S018R07
NODE=S018R07

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6 × 10^{-7}	90	[1] MCCRACKEN	15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode. NODE=S018R07;LINKAGE=A

$\Gamma(\pi^+\mu^-)/\Gamma_{\text{total}}$ Γ_8/Γ

NODE=S018R08
NODE=S018R08

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6 × 10^{-7}	90	[1] MCCRACKEN	15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode. NODE=S018R08;LINKAGE=A

$\Gamma(\pi^-e^+)/\Gamma_{\text{total}}$ Γ_9/Γ

NODE=S018R09
NODE=S018R09

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4 × 10^{-7}	90	[1] MCCRACKEN	15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode. NODE=S018R09;LINKAGE=A

$\Gamma(\pi^-\mu^+)/\Gamma_{\text{total}}$ Γ_{10}/Γ

NODE=S018R10
NODE=S018R10

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6 × 10^{-7}	90	[1] MCCRACKEN	15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode. NODE=S018R10;LINKAGE=A

$\Gamma(K^+e^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

NODE=S018R11
NODE=S018R11

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<2 × 10^{-6}	90	[1] MCCRACKEN	15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode. NODE=S018R11;LINKAGE=A

$\Gamma(K^+\mu^-)/\Gamma_{total}$ Γ_{12}/Γ

NODE=S018R12
NODE=S018R12

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3 \times 10^{-6}$	90	[1] MCCRACKEN 15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode.

NODE=S018R12;LINKAGE=A

$\Gamma(K^-e^+)/\Gamma_{total}$ Γ_{13}/Γ

NODE=S018R13
NODE=S018R13

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2 \times 10^{-6}$	90	[1] MCCRACKEN 15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode.

NODE=S018R13;LINKAGE=A

$\Gamma(K^-\mu^+)/\Gamma_{total}$ Γ_{14}/Γ

NODE=S018R14
NODE=S018R14

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3 \times 10^{-6}$	90	[1] MCCRACKEN 15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode.

NODE=S018R14;LINKAGE=A

$\Gamma(K^0_S\nu)/\Gamma_{total}$ Γ_{15}/Γ

NODE=S018R15
NODE=S018R15

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2 \times 10^{-5}$	90	[1] MCCRACKEN 15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode.

NODE=S018R15;LINKAGE=A

$\Gamma(\overline{p}\pi^+)/\Gamma_{total}$ Γ_{16}/Γ

NODE=S018R16
NODE=S018R16

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<9 \times 10^{-7}$	90	[1] MCCRACKEN 15	CLAS	$\gamma p \to K^+\Lambda$

[1] Uses B($\Lambda \to p\pi^-$) = (63.9 ± 0.5)% for normalization mode.

NODE=S018R16;LINKAGE=A

$\Gamma(\text{invisible})/\Gamma_{total}$ Γ_{17}/Γ

NODE=S018R01
NODE=S018R01

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<7.4 \times 10^{-5}$	90	ABLIKIM 22P	BES3	$J/\psi \to \Lambda\overline{\Lambda}$

Λ *CP*-violating decay-rate asymmetries

NODE=S018260

This is the difference between Λ and $\overline{\Lambda}$ decay rates to state f and $\overline{f}$ divided by the sum of the rates:
$A_{CP}(f) = [(\text{B}(\Lambda \to f)) - (\text{B}(\overline{\Lambda} \to \overline{f}))]/\text{Sum}$.

NODE=S018260

$A_{CP}(p\mu^-\overline{\nu}_\mu)$ in $\Lambda \to p\mu^-\overline{\nu}_\mu$, $\overline{\Lambda} \to \overline{p}\mu^+\nu_\mu$

NODE=S018B01
NODE=S018B01

VALUE	DOCUMENT ID	TECN	COMMENT
0.02±0.14±0.02	ABLIKIM 21AG	BES3	$J/\psi \to \Lambda\overline{\Lambda}$

Limit on $\overline{\Lambda}\Lambda$ oscillations

NODE=S018A05

Upper limit for the oscillation rate of ($\overline{\Lambda} \to \Lambda$) hyperons. A test of baryon number nonconservation. We quote the oscillation parameter $\delta m_{\overline{\Lambda}\Lambda}$, deduced from the oscillation rate P(Λ) and the hyperon lifetime τ_Λ, as $(\delta m_{\overline{\Lambda}\Lambda})^2$ = P(Λ) / $2\tau^2_\Lambda$.

NODE=S018A05

NODE=S018A05

VALUE (GeV)	CL%	DOCUMENT ID	TECN	COMMENT
$<3.8 \times 10^{-18}$	90	[1] ABLIKIM 23BM	BES3	$J/\psi \to pK^-\overline{\Lambda}$

[1] ABLIKIM 23BM quote the oscillation rate limit P(Λ) < 4.4×10^{-6} and calculate the oscillation parameter $\delta m_{\overline{\Lambda}\Lambda}$ given here.

NODE=S018A05;LINKAGE=A

Λ DECAY PARAMETERS

NODE=S018245

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

NODE=S018245

α_- FOR $\Lambda \to p\pi^-$

NODE=S018A-

OUR FIT value is obtained from measurements of $\alpha(\Xi^-)$, $\alpha_-(\Lambda)$, and $\alpha(\Xi^-)\alpha_-(\Lambda)$.

NODE=S018A-
NODE=S018A-

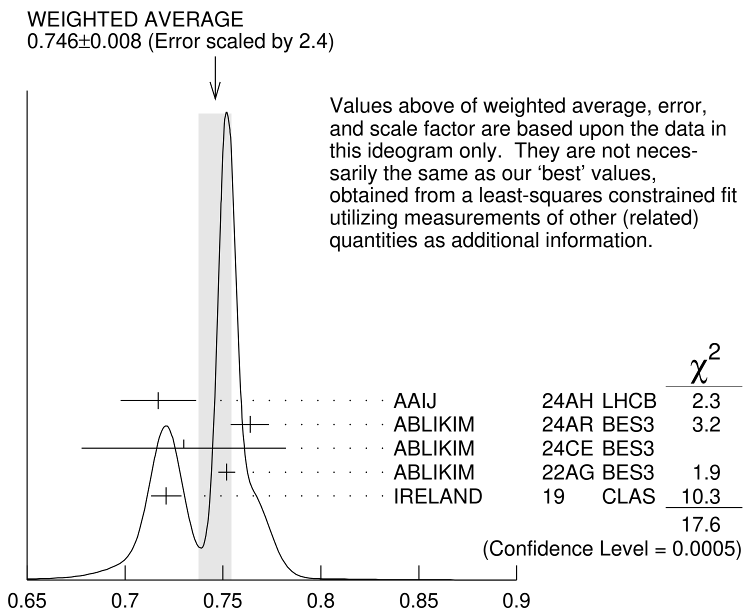
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.749 ±0.008 OUR FIT Error includes scale factor of 2.4.				
0.746 ±0.008 OUR AVERAGE Error includes scale factor of 2.4. See the ideogram below.				
0.717 ±0.017 ±0.009	27k	AAIJ 24AH	LHCB	$\Lambda_b \to \Lambda_c \to \Lambda h^+$
0.764 ±0.008 $^{+0.005}_{-0.006}$	144k	ABLIKIM 24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
0.730 ±0.051 ±0.011	1.1M	ABLIKIM 24CE	BES3	$J/\psi \to \Sigma\overline{\Sigma} \to \Lambda\overline{\Lambda}\gamma\gamma$
0.7519±0.0036±0.0024	3.2M	ABLIKIM 22AG	BES3	$J/\psi \to \Lambda\overline{\Lambda}$
0.721 ±0.006 ±0.005		[1] IRELAND 19	CLAS	K production

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

0.757 ±0.011 ±0.008	73k	ABLIKIM	22AD	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
0.74 $^{+0.04}_{-0.03}$		AAIJ	20O	LHCB	$\Lambda_b \to J/\psi\Lambda$
0.750 ±0.009 ±0.004	420k	ABLIKIM	19BJ	BES3	$J/\psi \to \Lambda\overline{\Lambda}$
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 Ξ decay
0.645 ±0.017	10130	OVERSETH	67	OSPK	Λ from $\pi^- p$
0.62 ±0.07	1156	CRONIN	63	CNTR	Λ from $\pi^- p$

[1] This is a new analysis based on existing kaon photoproduction data of the CLAS collaboration and using spin algebra constraints.

NODE=S018A-;LINKAGE=A



α_- FOR $\Lambda \to p\pi^-$

α_+ FOR $\overline{\Lambda} \to \overline{p}\pi^+$

NODE=S018A+
NODE=S018A+

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.758 ±0.005 OUR AVERAGE		Error includes scale factor of 1.2.			
−0.748 ±0.016 ±0.007	27k	AAIJ	24AH	LHCB	$\Lambda_b \to \Lambda_c \to \Lambda h^+$
−0.774 ±0.009 $^{+0.005}_{-0.005}$	123k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
−0.776 ±0.054 ±0.010	1.1M	ABLIKIM	24CE	BES3	$J/\psi \to \Sigma\overline{\Sigma} \to \Lambda\overline{\Lambda}\gamma\gamma$
−0.7559±0.0036±0.0030	3.2M	ABLIKIM	22AG	BES3	$J/\psi \to \Lambda\overline{\Lambda}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.763 ±0.011 ±0.007	73k	ABLIKIM	22AD	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
−0.758 ±0.010 ±0.007	420k	ABLIKIM	19BJ	BES3	$J/\psi \to \Lambda\overline{\Lambda}$
−0.755 ±0.083 ±0.063	8.7k	ABLIKIM	10	BES	$J/\psi \to \Lambda\overline{\Lambda}$
−0.63 ±0.13	770	TIXIER	88	DM2	$J/\psi \to \Lambda\overline{\Lambda}$

$\overline{\alpha}_0$ FOR $\overline{\Lambda} \to \overline{n}\pi^0$

NODE=S018A00
NODE=S018A00

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.675±0.011 OUR AVERAGE		Error includes scale factor of 1.2.			
−0.668±0.008 $^{+0.006}_{-0.008}$	123k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
−0.692±0.016±0.006	47k	ABLIKIM	19BJ	BES3	J/ψ to $\Lambda\overline{\Lambda}$

α_0 FOR $\Lambda \to n\pi^0$

NODE=S018A06
NODE=S018A06

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.670±0.009 $^{+0.009}_{-0.008}$	144k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

α_γ FOR $\Lambda \to n\gamma$

NODE=S018A04
NODE=S018A04

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.16±0.10±0.05	13889	ABLIKIM	22AJ	BES3	$J/\psi \to \Lambda\overline{\Lambda}$

ϕ ANGLE FOR $\Lambda \to p\pi^-$ ($\tan\phi = \beta / \gamma$)

NODE=S018F-
NODE=S018F-

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

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

NODE=S018A0
NODE=S018A0

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.888^{+0.034}_{-0.030}$ OUR AVERAGE Error includes scale factor of 1.7.					
$0.877\pm0.015^{+0.014}_{-0.010}$	144k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
1.000±0.068	4760	[1] OLSEN	70	OSPK	$\pi^+ n \to \Lambda K^+$
1.10 ±0.27		CORK	60	CNTR	

[1] OLSEN 70 compares proton and neutron distributions from Λ decay. NODE=S018A0;LINKAGE=O

$\overline{\alpha}_0 / \alpha_+$ in $\overline{\Lambda} \to \overline{n}\pi^0$, $\overline{\Lambda} \to \overline{p}\pi^+$

NODE=S018A1
NODE=S018A1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.876^{+0.022}_{-0.020}$ OUR AVERAGE Error includes scale factor of 1.4.					
$0.863\pm0.014^{+0.012}_{-0.008}$	123k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
0.913±0.028±0.012	47k	ABLIKIM	19BJ	BES3	J/ψ to $\Lambda\overline{\Lambda}$

$(\alpha_- + \alpha_+)/(\alpha_- - \alpha_+)$ in $\Lambda \to p\pi^-$, $\overline{\Lambda} \to \overline{p}\pi^+$

NODE=S018AL

Zero if *CP* is conserved; α_- and α_+ are the asymmetry parameters for $\Lambda \to p\pi^-$ and $\overline{\Lambda} \to \overline{p}\pi^+$ decay. See also the Ξ^- for a similar test involving the decay chain $\Xi^- \to \Lambda\pi^-$, $\Lambda \to p\pi^-$ and the corresponding antiparticle chain. NODE=S018AL

NODE=S018AL

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
−0.3 ± 0.4 OUR AVERAGE					
−2.2 ± 1.6 ±0.7	27k	AAIJ	24AH	LHCB	$\Lambda_b \to \Lambda_c \to \Lambda h^+$
$-0.7 \pm 0.8\ ^{+0.2}_{-0.3}$	267k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
3.0 ± 6.9 ±1.5	1.1M	ABLIKIM	24CE	BES3	$J/\psi/\psi(2S) \to \Sigma\overline{\Sigma} \to \Lambda\overline{\Lambda}\gamma\gamma$
1.3 ± 0.7 ±1.1	369k	[1] LI	23C	BELL	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$ OCCUR=2
−0.25± 0.46±0.12	3.2M	ABLIKIM	22AG	BES3	$J/\psi \to \Lambda\overline{\Lambda}$
−8.1 ± 5.5 ±5.9	8.7k	ABLIKIM	10	BES	$J/\psi \to \Lambda\overline{\Lambda}$
1.3 ± 2.2	96k	BARNES	96	CNTR	LEAR $\overline{p}p \to \overline{\Lambda}\Lambda$
1 ±10	770	TIXIER	88	DM2	$J/\psi \to \Lambda\overline{\Lambda}$
−2 ±14	10k	[2] CHAUVAT	85	CNTR	pp, $\overline{p}p$ ISR
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.4 ± 1.2 ±0.9	73k	ABLIKIM	22AD	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
−0.6 ± 1.2 ±0.7	420k	[3] ABLIKIM	19BJ	BES3	$J/\psi \to \Lambda\overline{\Lambda}$
−7 ± 9	4063	BARNES	87	CNTR	See BARNES 96

[1] LI 23C quote the average Λ-hyperon asymmetry A^{α}_{CP} from 264k $\Lambda_c^+ \to \Lambda\pi^+$ decays and 105k $\Lambda_c^+ \to \Sigma^0\pi^+$ decays, under the assumption of no *CP* violation in the SM for Λ_c^+, i.e. $\alpha_{\Lambda_c^+} = -\alpha_{\overline{\Lambda}_c^-}$. NODE=S018AL;LINKAGE=D

[2] CHAUVAT 85 actually gives $\alpha_+(\overline{\Lambda})/\alpha_-(\Lambda) = -1.04 \pm 0.29$. Assumes polarization is same in $\overline{p}p \to \overline{\Lambda}X$ and $pp \to \Lambda X$. Tests of this assumption, based on *C*-invariance and fragmentation, are satisfied by the data. NODE=S018AL;LINKAGE=A

[3] Superseded by ABLIKIM 22AG. NODE=S018AL;LINKAGE=E

$(\alpha_0 + \overline{\alpha}_0)/(\alpha_0 - \overline{\alpha}_0)$ in $\Lambda \to n\pi^0$, $\overline{\Lambda} \to \overline{n}\pi^0$

NODE=S018A07
NODE=S018A07

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$0.1\pm0.9^{+0.5}_{-0.7}$	267k	ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

$R = \lvert G_E/G_M \rvert$ in $\Lambda \to p\pi^-$, $\overline{\Lambda} \to \overline{p}\pi^+$

NODE=S018A02
NODE=S018A02

VALUE	DOCUMENT ID		TECN	COMMENT
0.96±0.14±0.02	[1] ABLIKIM	19BF	BES3	$e^+e^- \to \overline{\Lambda}\Lambda$ at $\sqrt{s} =$ 2.396 GeV

[1] Determined using the latest BES-III value on the asymmetry parameter $\alpha = 0.750 \pm 0.010$. NODE=S018A02;LINKAGE=A

$\Delta\Phi = \Phi_E - \Phi_M$ in $\Lambda \to p\pi^-$, $\overline{\Lambda} \to \overline{p}\pi^+$

NODE=S018A03
NODE=S018A03

VALUE (degrees)	DOCUMENT ID		TECN	COMMENT
37±12±6	[1] ABLIKIM	19BF	BES3	$e^+ e^- \to \overline{\Lambda}\Lambda$ at $\sqrt{s}=$ 2.396 GeV

[1] Relative phase between GE and GM, determined using the latest BES-III value on the asymmetry parameter $\alpha = 0.750 \pm 0.010$.

NODE=S018A03;LINKAGE=A

g_A / g_V FOR $\Lambda \to pe^-\overline{\nu}_e$

NODE=S018AV
NODE=S018AV

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.

NODE=S018AV

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.718±0.015 OUR AVERAGE					
−0.719±0.016±0.012	37k	[1] DWORKIN	90	SPEC	$e\nu$ angular corr.
−0.70 ±0.03	7111	BOURQUIN	83	SPEC	$\Xi \to \Lambda\pi^-$
−0.734±0.031	10k	[2] 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 Λ

[1] 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 ± 0.30, and then $g_A/g_V = -0.731 \pm 0.016$.

NODE=S018AV;LINKAGE=D

[2] This experiment measures only the absolute value of g_A/g_V.

NODE=S018AV;LINKAGE=M

Λ REFERENCES

NODE=S018

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

NODE=S018

AAIJ	24AH	PRL 133 261804	R. Aaij *et al.*	(LHCb Collab.)	REFID=63074
ABLIKIM	24AR	PRL 132 101801	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62716
ABLIKIM	24CE	PRL 133 101902	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63045
ABLIKIM	23BM	PRL 131 121801	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62447
ACHARYA	23	PR D108 032009	S. Acharya *et al.*	(ALICE Collab.)	REFID=62348
LI	23C	SCIB 68 583	L.K. Li *et al.*	(BELLE Collab.)	REFID=62184
ABLIKIM	22AD	NAT 606 64	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61849
ABLIKIM	22AG	PRL 129 131801	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61879
ABLIKIM	22AJ	PRL 129 212002	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61882
ABLIKIM	22P	PR D105 L071101	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61660
ABLIKIM	21AG	PRL 127 121802	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61431
AAIJ	20O	JHEP 2006 110	R. Aaij *et al.*	(LHCb Collab.)	REFID=60503
ABLIKIM	19BF	PRL 123 122003	M. Ablikim *et al.*	(BESIII Collab.)	REFID=60057
ABLIKIM	19BJ	NATP 15 631	M. Ablikim *et al.*	(BESIII Collab.)	REFID=59643
IRELAND	19	PRL 123 182301	D.G. Ireland *et al.*	(GLAS, GWU, JULI+)	REFID=60067
MCCRACKEN	15	PR D92 072002	M.E. McCracken *et al.*	(JLab CLAS Collab.)	REFID=56525
ABLIKIM	10	PR D81 012003	M. Ablikim *et al.*	(BES Collab.)	REFID=53223
BARNES	96	PR C54 1877	P.D. Barnes *et al.*	(CERN PS-185 Collab.)	REFID=48062
RYBICKI	96	APP B27 2155	K. Rybicki		REFID=47513
HARTOUNI	94	PRL 72 1322	E.P. Hartouni *et al.*	(BNL E766 Collab.)	REFID=43688
Also		PRL 72 2821 (errat.)	E.P. Hartouni *et al.*	(BNL E766 Collab.)	REFID=43913
LARSON	93	PR D47 799	K.D. Larson *et al.*	(BNL-811 Collab.)	REFID=43099
NOBLE	92	PRL 69 414	A.J. Noble *et al.*	(BIRM, BOST, BRCO+)	REFID=42138
DWORKIN	90	PR D41 780	J. Dworkin *et al.*	(MICH, WISC, RUTG+)	REFID=41060
TIXIER	88	PL B212 523	M.H. Tixier *et al.*	(DM2 Collab.)	REFID=40593
BARNES	87	PL B199 147	P.D. Barnes *et al.*	(CMU, SACL, LANL+)	REFID=40320
BIAGI	86	ZPHY C30 201	S.F. Biagi *et al.*	(BRIS, CERN, GEVA+)	REFID=11825
CHAUVAT	85	PL 163B 273	P. Chauvat *et al.*	(CERN, CLER, UCLA+)	REFID=11824
BOURQUIN	83	ZPHY C21 1	M.H. Bourquin *et al.*	(BRIS, GEVA, HEIDP+)	REFID=11823
COX	81	PRL 46 877	P.T. Cox *et al.*	(MICH, WISC, RUTG, MINN+)	REFID=11820
PONDROM	81	PR D23 814	L. Pondrom *et al.*	(WISC, MICH, RUTG+)	REFID=11821
WISE	81	PL 98B 123	J.E. Wise *et al.*	(MASA, BNL)	REFID=11822
WISE	80	PL 91B 165	J.E. Wise *et al.*	(MASA, BNL)	REFID=11819
SCHACHIN...	78	PRL 41 1348	L. Schachinger *et al.*	(MICH, RUTG, WISC)	REFID=11818
HELLER	77	PL 68B 480	K. Heller *et al.*	(MICH, WISC, HEIDH)	REFID=11814
LINDQUIST	77	PR D16 2104	J. Lindquist *et al.*	(EFI, OSU, ANL)	REFID=11815
Also		JP G2 L211	J. Lindquist *et al.*	(EFI, WUSL, OSU+)	REFID=11816
ZECH	77	NP B124 413	G. Zech *et al.*	(SIEG, CERN, DORT, HEIDH)	REFID=11817
BUNCE	76	PRL 36 1113	G.R.M. Bunce *et al.*	(WISC, MICH, RUTG)	REFID=11812
ASTBURY	75	NP B99 30	P. Astbury *et al.*	(LOIC, CERN, ETH+)	REFID=11810
CLAYTON	75	NP B95 130	E.F. Clayton *et al.*	(LOIC, RHEL)	REFID=11811
ALTHOFF	73	PL 43B 237	K.H. Althoff *et al.*	(CERN, HEID)	REFID=11806
ALTHOFF	73B	NP B66 29	K.H. Althoff *et al.*	(CERN, HEID)	REFID=11807
KATZ	73	Thesis MDDP-TR-74-044	C.N. Katz	(UMD)	REFID=11808
POULARD	73	PL 46B 135	G. Poulard, A. Givernaud, A.C. Borg	(SACL)	REFID=11809
BAGGETT	72B	ZPHY 252 362	M.J. Baggett *et al.*	(HEID)	REFID=11801
BAGGETT	72C	PL 42B 379	M.J. Baggett *et al.*	(HEID)	REFID=11802
CLELAND	72	NP B40 221	W.E. Cleland *et al.*	(CERN, GEVA, LUND)	REFID=11804
HYMAN	72	PR D5 1063	L.G. Hyman *et al.*	(ANL, CMU)	REFID=11805
ALTHOFF	71	PL 37B 531	K.H. Althoff *et al.*	(CERN, HEID)	REFID=11789
BALTAY	71B	PR D4 670	C. Baltay *et al.*	(COLU, BING)	REFID=11791
BARONI	71	LNC 2 1256	G. Baroni, S. Petrera, G. Romano	(ROMA)	REFID=11793

CANTER	71	PRL 26 868	J. Canter *et al.*	(STON, COLU)	REFID=11794
CANTER	71B	PRL 27 59	J. Canter *et al.*	(STON, COLU)	REFID=11795
DAHL-JENSEN	71	NC 3A 1	E. Dahl-Jensen *et al.*	(CERN, ANKA, LAUS+)	REFID=11796
LINDQUIST	71	PRL 27 612	J. Lindquist *et al.*	(EFI, WUSL, OSU+)	REFID=11799
OLSEN	70	PRL 24 843	S.L. Olsen *et al.*	(WISC, MICH)	REFID=11788
DAUBER	69	PR 179 1262	P.M. Dauber *et al.*	(LRL)	REFID=11783
DOYLE	69	Thesis UCRL 18139	J.C. Doyle	(LRL)	REFID=11074
MALONEY	69	PRL 23 425	J.E. Maloney, B. Sechi-Zorn	(UMD)	REFID=11785
GRIMM	68	NC 54A 187	H.J. Grimm	(HEID)	REFID=11780
HEPP	68	ZPHY 214 71	V. Hepp, H. Schleich	(HEID)	REFID=11781
BADIER	67	PL 25B 152	J. Badier *et al.*	(EPOL)	REFID=11776
MAYEUR	67	U.Libr.Brux.Bul. 32	C. Mayeur, E. Tompa, J.H. Wickens	(BELG, LOUC)	REFID=11778
OVERSETH	67	PRL 19 391	O.E. Overseth, R.F. Roth	(MICH, PRIN)	REFID=11779
PDG	67	RMP 39 1	A.H. Rosenfeld *et al.*	(LRL, CERN, YALE)	REFID=41171
BURAN	66	PL 20 318	T. Buran *et al.*	(OSLO)	REFID=11770
CHIEN	66	PR 152 1171	C.Y. Chien *et al.*	(YALE, BNL)	REFID=11771
ENGELMANN	66	NC 45A 1038	R. Engelmann *et al.*	(HEID, REHO)	REFID=11772
GIBSON	66	NC 45A 882	W.M. Gibson, K. Green	(BRIS)	REFID=11773
LONDON	66	PR 143 1034	G.W. London *et al.*	(BNL, SYRA)	REFID=11774
SCHMIDT	65	PR 140 B1328	P. Schmidt	(COLU)	REFID=11768
BAGLIN	64	NC 35 977	C. Baglin *et al.*	(EPOL, CERN, LOUC, RHEL+)	REFID=11753
HUBBARD	64	PR 135 B183	J.R. Hubbard *et al.*	(LRL)	REFID=11754
LIND	64	PR 135 B1483	V.G. Lind *et al.*	(WISC)	REFID=11757
RONNE	64	PL 11 357	B.E. Ronne *et al.*	(CERN, EPOL, LOUC+)	REFID=11758
SCHWARTZ	64	Thesis UCRL 11360	J.A. Schwartz	(LRL)	REFID=11759
BHOWMIK	63	NC 28 1494	B. Bhowmik, D.P. Goyal	(DELH)	REFID=11745
BLOCK	63	PR 130 766	M.M. Block *et al.*	(NWES, BGNA, SYRA+)	REFID=11746
BROWN	63	PR 130 769	J.L. Brown *et al.*	(LRL, MICH)	REFID=11057
CHRETIEN	63	PR 131 2208	M. Chretien *et al.*	(BRAN, BROW, HARV+)	REFID=11056
CRONIN	63	PR 129 1795	J.W. Cronin, O.E. Overseth	(PRIN)	REFID=11749
ELY	63	PR 131 868	R.P. Ely *et al.*	(LRL)	REFID=11750
HUMPHREY	62	PR 127 1305	W.E. Humphrey, R.R. Ross	(LRL)	REFID=11743
CORK	60	PR 120 1000	B. Cork *et al.*	(LRL, PRIN, BNL)	REFID=11735
CRAWFORD	59B	PRL 2 266	F.S. Crawford *et al.*	(LRL)	REFID=11049