NODE=S022

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

NODE=S022

The parity has not actually been measured, but + is of course expected.

We have omitted some results that have been superseded by later experiments.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

Ξ^- MASS

NODE=S022M

The fit uses the Ξ^-, $\overline{\Xi}^+$, and Ξ^0 masses and the Ξ^-–$\overline{\Xi}^+$ mass difference. It assumes that the Ξ^- and $\overline{\Xi}^+$ masses are the same.

NODE=S022M

NODE=S022M

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1321.71±0.07 OUR FIT					
1321.70±0.08±0.05	2478 ± 68	ABDALLAH	06E	DLPH	from Z decays
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1321.46±0.34	632	DIBIANCA	75	DBC	4.9 GeV/c $K^- d$
1321.12±0.41	268	WILQUET	72	HLBC	
1321.87±0.51	195	[1] GOLDWASSER	70	HBC	5.5 GeV/c $K^- p$
1321.67±0.52	6	CHIEN	66	HBC	6.9 GeV/c $\overline{p} p$
1321.4 ±1.1	299	LONDON	66	HBC	
1321.3 ±0.4	149	PJERROU	65B	HBC	
1321.1 ±0.3	241	[2] BADIER	64	HBC	
1321.4 ±0.4	517	[2] JAUNEAU	63D	FBC	
1321.1 ±0.65	62	[2] SCHNEIDER	63	HBC	

[1] GOLDWASSER 70 uses m_Λ = 1115.58 MeV.

NODE=S022M;LINKAGE=G

[2] These masses have been increased 0.09 MeV because the Λ mass increased.

NODE=S022M;LINKAGE=M

$\overline{\Xi}^+$ MASS

NODE=S022M1

The fit uses the Ξ^-, $\overline{\Xi}^+$, and Ξ^0 masses and the $\Xi^- - \overline{\Xi}^+$ mass difference. It assumes that the Ξ^- and $\overline{\Xi}^+$ masses are the same.

NODE=S022M1

NODE=S022M1

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1321.71±0.07 OUR FIT					
1321.73±0.08±0.05	2256 ± 63	ABDALLAH	06E	DLPH	from Z decays
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1321.6 ±0.8	35	VOTRUBA	72	HBC	10 GeV/c $K^+ p$
1321.2 ±0.4	34	STONE	70	HBC	
1320.69±0.93	5	CHIEN	66	HBC	6.9 GeV/c $\overline{p} p$

$(m_{\Xi^-} - m_{\overline{\Xi}^+}) / m_{\Xi^-}$

NODE=S022DMM

A test of CPT invariance.

NODE=S022DMM

NODE=S022DMM

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{(-2.5\pm8.7)\times10^{-5}}$	ABDALLAH	06E	DLPH	from Z decays

Ξ^- MEAN LIFE

NODE=S022T

Measurements with an error > 0.2×10^{-10} s or with systematic errors not included have been omitted.

NODE=S022T

NODE=S022T

VALUE (10^{-10} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.639±0.015 OUR AVERAGE					
1.65 ±0.07 ±0.12	2478 ± 68	ABDALLAH	06E	DLPH	from Z decays
1.652±0.051	32k	BOURQUIN	84	SPEC	Hyperon beam
1.665±0.065	41k	BOURQUIN	79	SPEC	Hyperon beam
1.609±0.028	4286	HEMINGWAY	78	HBC	4.2 GeV/c $K^- p$
1.67 ±0.08		DIBIANCA	75	DBC	4.9 GeV/c $K^- d$
1.63 ±0.03	4303	BALTAY	74	HBC	1.75 GeV/c $K^- p$

$1.73\ ^{+0.08}_{-0.07}$	680	MAYEUR	72	HLBC	2.1 GeV/c K^-
$1.61\ \pm0.04$	2610	DAUBER	69	HBC	
$1.80\ \pm0.16$	299	LONDON	66	HBC	
$1.70\ \pm0.12$	246	PJERROU	65B	HBC	
$1.69\ \pm0.07$	794	HUBBARD	64	HBC	
$1.86\ ^{+0.15}_{-0.14}$	517	JAUNEAU	63D	FBC	

$\overline{\Xi}^+$ MEAN LIFE

NODE=S022T1

NODE=S022T1

VALUE (10^{-10} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.70±0.08±0.12	2256 ± 63	ABDALLAH	06E	DLPH	from Z decays
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.55^{+0.35}_{-0.20}$	35	[1] VOTRUBA	72	HBC	10 GeV/c $K^+ p$
$1.6\ \pm0.3$	34	STONE	70	HBC	
$1.9\ ^{+0.7}_{-0.5}$	12	[1] SHEN	67	HBC	
1.51 ± 0.55	5	[1] CHIEN	66	HBC	6.9 GeV/c $\overline{p}p$

[1] The error is statistical only.

NODE=S022T1;LINKAGE=S

$(\tau_{\Xi^-} - \tau_{\overline{\Xi}^+}) / \tau_{\Xi^-}$

NODE=S022DT

A test of *CPT* invariance.

NODE=S022DT

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.01±0.07	ABDALLAH	06E	DLPH	from Z decays

NODE=S022DT

Ξ^- MAGNETIC MOMENT

NODE=S022MM

See the "Quark Model" review.

NODE=S022MM

NODE=S022MM

VALUE (μ_N)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.6507±0.0025 OUR AVERAGE					
−0.6505±0.0025	4.36M	DURYEA	92	SPEC	800 GeV p Be
−0.661 ±0.036 ±0.036	44k	TROST	89	SPEC	Ξ^- ∼ 250 GeV
−0.69 ±0.04	218k	RAMEIKA	84	SPEC	400 GeV pBe
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−0.674 ±0.021 ±0.020	122k	HO	90	SPEC	See DURYEA 92
−2.1 ±0.8	2436	COOL	74	OSPK	1.8 GeV/c $K^- p$
−0.1 ±2.1	2724	BINGHAM	70B	OSPK	1.8 GeV/c $K^- p$

$\overline{\Xi}^+$ MAGNETIC MOMENT

NODE=S022MM+

See the "Quark Model" review.

NODE=S022MM+

NODE=S022MM+

VALUE (μ_N)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
+0.657±0.028±0.020	70k	HO	90	SPEC	800 GeV pBe

$(\mu_{\Xi^-} + \mu_{\overline{\Xi}^+}) / |\mu_{\Xi^-}|$

NODE=S022MMD

A test of *CPT* invariance. We calculate this from the Ξ^- and $\overline{\Xi}^+$ magnetic moments above.

NODE=S022MMD

VALUE	*DOCUMENT ID*
+0.01±0.05 OUR EVALUATION	

NODE=S022MMD
→ UNCHECKED ←

Ξ^- DECAY MODES

NODE=S022235;NODE=S022

	Mode		Fraction (Γ_i/Γ)	Confidence level	
Γ_1	$\Lambda\pi^-$		(99.887 ± 0.035) %		DESIG=1
Γ_2	$\Sigma^-\gamma$		$(1.27\ \pm0.23) \times 10^{-4}$		DESIG=9
Γ_3	$\Lambda e^-\overline{\nu}_e$		$(5.63\ \pm0.31) \times 10^{-4}$		DESIG=2
Γ_4	$\Lambda\mu^-\overline{\nu}_\mu$		$(3.5\ ^{+3.5}_{-2.2}) \times 10^{-4}$		DESIG=4
Γ_5	$\Sigma^0 e^-\overline{\nu}_e$		$(8.7\ \pm1.7) \times 10^{-5}$		DESIG=5
Γ_6	$\Sigma^0\mu^-\overline{\nu}_\mu$		$< 8 \times 10^{-4}$	90%	DESIG=6
Γ_7	$\Xi^0 e^-\overline{\nu}_e$		$< 2.59 \times 10^{-4}$	90%	DESIG=13
	$\Delta S = 2$ forbidden ($S2$) modes				NODE=S022;CLUMP=A
Γ_8	$n\pi^-$	$S2$	$< 1.9 \times 10^{-5}$	90%	DESIG=3
Γ_9	$n e^-\overline{\nu}_e$	$S2$	$< 3.2 \times 10^{-3}$	90%	DESIG=7
Γ_{10}	$n\mu^-\overline{\nu}_\mu$	$S2$	< 1.5 %	90%	DESIG=8
Γ_{11}	$p\pi^-\pi^-$	$S2$	$< 4 \times 10^{-4}$	90%	DESIG=10
Γ_{12}	$p\pi^- e^-\overline{\nu}_e$	$S2$	$< 4 \times 10^{-4}$	90%	DESIG=11
Γ_{13}	$p\pi^-\mu^-\overline{\nu}_\mu$	$S2$	$< 4 \times 10^{-4}$	90%	DESIG=12
Γ_{14}	$p\mu^-\mu^-$	L	$< 4 \times 10^{-8}$	90%	DESIG=14
Γ_{15}	π^- invisible		not seen		DESIG=15

CONSTRAINED FIT INFORMATION

An overall fit to 4 branching ratios uses 5 measurements and one constraint to determine 5 parameters. The overall fit has a $\chi^2 =$ 1.0 for 1 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, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_2	−6			
x_3	−8	0		
x_4	−99	0	−1	
x_5	−5	0	0	0
	x_1	x_2	x_3	x_4

Ξ^- BRANCHING RATIOS

NODE=S022240

A number of early results have been omitted.

NODE=S022240

$\Gamma(\Sigma^-\gamma)/\Gamma(\Lambda\pi^-)$ — Γ_2/Γ_1

NODE=S022R9
NODE=S022R9

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.27±0.24 OUR FIT					
1.27±0.23 OUR AVERAGE					
1.22±0.23±0.06	211	[1] DUBBS	94	E761	Ξ^- 375 GeV
2.27±1.02	9	BIAGI	87B	SPEC	SPS hyperon beam

[1] DUBBS 94 also finds weak evidence that the asymmetry parameter α_γ is positive ($\alpha_\gamma = 1.0 \pm 1.3$).

NODE=S022R9;LINKAGE=A

$\Gamma(\Lambda e^-\overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ — Γ_3/Γ_1

NODE=S022R1
NODE=S022R1

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.564±0.031 OUR FIT					
0.564±0.031	2857	BOURQUIN	83	SPEC	SPS hyperon beam
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.30 ±0.13	11	THOMPSON	80	ASPK	Hyperon beam

$\Gamma(\Lambda\mu^-\overline{\nu}_\mu)/\Gamma(\Lambda\pi^-)$ — Γ_4/Γ_1

NODE=S022R3
NODE=S022R3

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$0.35^{+0.35}_{-0.22}$ OUR FIT						
0.35±0.35		1	YEH	74	HBC	Effective denom.=2859
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 2.3	90	0	THOMPSON	80	ASPK	Effective denom.=1017
< 1.3			DAUBER	69	HBC	
<12			BERGE	66	HBC	

$\Gamma(\Sigma^0 e^-\overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ — Γ_5/Γ_1

NODE=S022R4
NODE=S022R4

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
0.087±0.017 OUR FIT					
0.087±0.017	154	BOURQUIN	83	SPEC	SPS hyperon beam

$\left[\Gamma(\Lambda e^-\overline{\nu}_e)+\Gamma(\Sigma^0 e^-\overline{\nu}_e)\right]/\Gamma(\Lambda\pi^-)$ — $(\Gamma_3+\Gamma_5)/\Gamma_1$

NODE=S022R7
NODE=S022R7

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.651±0.031	3011	[1] BOURQUIN	83	SPEC	SPS hyperon beam
0.68 ±0.22	17	[2] DUCLOS	71	OSPK	

[1] See the separate BOURQUIN 83 values for $\Gamma(\Lambda e^-\overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ and $\Gamma(\Sigma^0 e^-\overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ above.

NODE=S022R7;LINKAGE=B

[2] DUCLOS 71 cannot distinguish Σ^0's from Λ's. The Cabibbo theory predicts the Σ^0 rate is about a factor 6 smaller than the Λ rate.

NODE=S022R7;LINKAGE=D

$\Gamma(\Sigma^0\mu^-\overline{\nu}_\mu)/\Gamma(\Lambda\pi^-)$ — Γ_6/Γ_1

NODE=S022R5
NODE=S022R5

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.76	90	0	YEH	74	HBC	Effective denom.=3026
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<5			BERGE	66	HBC	

$\Gamma(\Xi^0 e^-\overline{\nu}_e)/\Gamma_{total}$ — Γ_7/Γ

NODE=S022R00
NODE=S022R00

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.59\times10^{-4}$	90	ABLIKIM	21AH	BES3	$J/\psi\to\ \Xi\overline{\Xi}$

$\Gamma(\Xi^0 e^-\overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ — Γ_7/Γ_1

NODE=S022R13
NODE=S022R13

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.3\times10^{-3}$	90	YEH	74	HBC	Effective denom.=1000

$\Gamma(n\pi^-)/\Gamma(\Lambda\pi^-)$ — Γ_8/Γ_1

NODE=S022R2

ΔS=2. Forbidden in first-order weak interaction.

NODE=S022R2
NODE=S022R2

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.019	90		BIAGI	82B	SPEC	SPS hyperon beam
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<3.0	90	0	YEH	74	HBC	Effective denom.=760
<1.1			DAUBER	69	HBC	
<5.0			FERRO-LUZZI	63	HBC	

$\Gamma(ne^-\overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ — Γ_9/Γ_1

NODE=S022R6

ΔS=2. Forbidden in first-order weak interaction.

NODE=S022R6
NODE=S022R6

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
< 3.2	90	0	YEH	74	HBC	Effective denom.=715
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<10	90		BINGHAM	65	RVUE	

$\Gamma(n\mu^-\overline{\nu}_\mu)/\Gamma(\Lambda\pi^-)$ — Γ_{10}/Γ_1

NODE=S022R8

ΔS=2. Forbidden in first-order weak interaction.

NODE=S022R8
NODE=S022R8

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<15.3	90	0	YEH	74	HBC	Effective denom.=150

$\Gamma(p\pi^-\pi^-)/\Gamma(\Lambda\pi^-)$ — Γ_{11}/Γ_1

NODE=S022R10

ΔS=2. Forbidden in first-order weak interaction.

NODE=S022R10
NODE=S022R10

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.7	90	0	YEH	74	HBC	Effective denom.=6200

$\Gamma(p\pi^- e^- \overline{\nu}_e)/\Gamma(\Lambda\pi^-)$ Γ_{12}/Γ_1

NODE=S022R11

ΔS=2. Forbidden in first-order weak interaction.

NODE=S022R11
NODE=S022R11

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.7	90	0	YEH	74	HBC	Effective denom.=6200

$\Gamma(p\pi^- \mu^- \overline{\nu}_\mu)/\Gamma(\Lambda\pi^-)$ Γ_{13}/Γ_1

NODE=S022R12

ΔS=2. Forbidden in first-order weak interaction.

NODE=S022R12
NODE=S022R12

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<3.7	90	0	YEH	74	HBC	Effective denom.=6200

$\Gamma(p\mu^- \mu^-)/\Gamma(\Lambda\pi^-)$ Γ_{14}/Γ_1

NODE=S022R14

A ΔL=2 decay, forbidden by total lepton number conservation.

NODE=S022R14
NODE=S022R14

VALUE (units 10^{-8})	CL%	DOCUMENT ID		TECN	COMMENT
<4.0	90	RAJARAM	05	HYCP	p Cu, 800 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.7 \times 10^4$	90	[1] LITTENBERG	92B	HBC	Uses YEH 74 data

[1] This LITTENBERG 92B limit and the identical YEH 74 limits for the preceding three modes all result from nonobservance of any 3-prong decays of the Ξ^-. One could as well apply the limit to the *sum* of the four modes.

NODE=S022R14;LINKAGE=A

$\Gamma(\pi^-\text{ invisible})/\Gamma_{\text{total}}$ Γ_{15}/Γ

NODE=S022R01
NODE=S022R01

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	[1] ABLIKIM	25CQ	BES3	$J/\psi \to \Xi\overline{\Xi}$

[1] ABLIKIM 25CQ reports branching fraction limits ranging from 8×10^{-4} to 5×10^{-5} at 95% CL over the mass range 1.07–1.16 GeV for the invisible particle.

NODE=S022R01;LINKAGE=A

Ξ DECAY PARAMETERS

NODE=S022245

See the "Note on Baryon Decay Parameters" in the neutron Listings.

NODE=S022245

$\alpha(\Xi^-)\alpha_-(\Lambda)$

NODE=S022AA

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

NODE=S022AA
NODE=S022AA

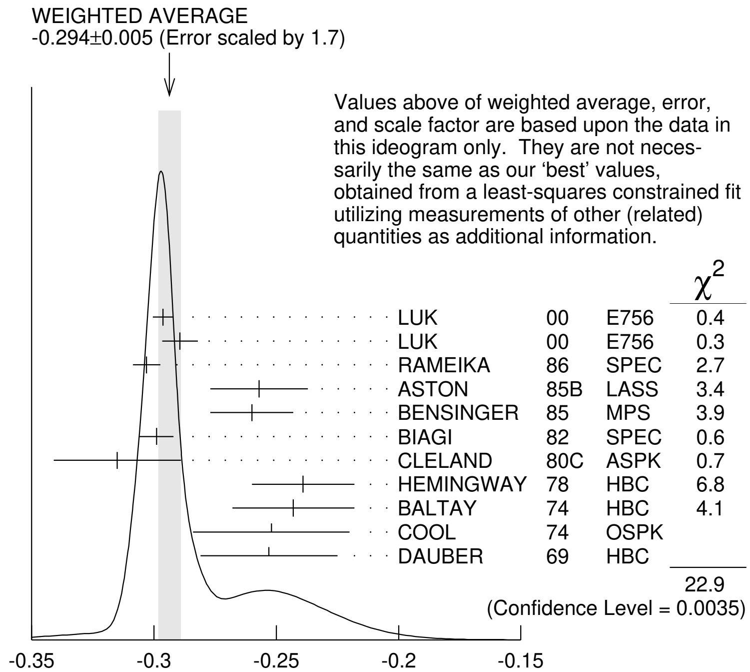
NEW

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.288 ±0.005 OUR FIT Error includes scale factor of 2.2. [−0.288 ± 0.005 OUR 2025 FIT Scale factor = 2.2]					
−0.294 ±0.005 OUR AVERAGE Error includes scale factor of 1.7. See the ideogram below.					
−0.2963±0.0042	189k	LUK	00	E756	p Be, 800 GeV
−0.2894±0.0073	63k	[1] LUK	00	E756	p Be, 800 GeV
−0.303 ±0.004 ±0.004	192k	RAMEIKA	86	SPEC	400 GeV pBe
−0.257 ±0.020	11k	ASTON	85B	LASS	11 GeV/c $K^- p$
−0.260 ±0.017	21k	BENSINGER	85	MPS	5 GeV/c $K^- p$
−0.299 ±0.007	150k	BIAGI	82	SPEC	SPS hyperon beam
−0.315 ±0.026	9046	CLELAND	80C	ASPK	BNL hyperon beam
−0.239 ±0.021	6599	HEMINGWAY	78	HBC	4.2 GeV/c $K^- p$
−0.243 ±0.025	4303	BALTAY	74	HBC	1.75 GeV/c $K^- p$
−0.252 ±0.032	2436	COOL	74	OSPK	1.8 GeV/c $K^- p$
−0.253 ±0.028	2781	DAUBER	69	HBC	

OCCUR=2

[1] This LUK 00 value is for $\alpha(\overline{\Xi}^+)\ \alpha_+(\overline{\Lambda})$. We assume *CP* conservation here by including it in the average for $\alpha(\Xi^-)\ \alpha_-(\Lambda)$. But see the second data block below for the *CP* test.

NODE=S022AA;LINKAGE=L2



$\alpha(\Xi^-)\alpha_-(\Lambda)$

$\alpha(\Xi^-)$ for $\Xi^- \to \Lambda\pi^-$

NODE=S022A

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

NODE=S022A
NODE=S022A

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
-0.385 ± 0.008 OUR FIT Error includes scale factor of 2.4. [-0.385 ± 0.008 OUR 2025 FIT Scale factor = 2.4]				
$-0.367\pm0.004^{+0.003}_{-0.004}$	144k	ABLIKIM	24AR BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.376\pm0.007\pm0.003$	73k	ABLIKIM	22AD BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$-0.344\pm0.025\pm0.007$	5.4k	ABLIKIM	22BE BES3	$\psi(3686) \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

NEW

$\overline{\alpha}(\overline{\Xi}^+)$ for $\overline{\Xi}^+ \to \overline{\Lambda}\pi^+$

NODE=S022A00
NODE=S022A00

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$0.374\pm0.004^{+0.003}_{-0.004}$	123k	ABLIKIM	24AR BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.371\pm0.007\pm0.002$	73k	ABLIKIM	22AD BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$0.355\pm0.025\pm0.002$	5.4k	ABLIKIM	22BE BES3	$\psi(3686) \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

$(\alpha + \overline{\alpha})$ / $(\alpha - \overline{\alpha})$ for $\Xi^- \to \Lambda\pi^-$, $\overline{\Xi}^+ \to \overline{\Lambda}\pi^+$

NODE=S022A01
NODE=S022A01

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
$-9\pm 8^{+7}_{-2}$	267k	ABLIKIM	24AR BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$6\pm13\pm 6$	73k	ABLIKIM	22AD BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$-15\pm51\pm10$	5.4k	ABLIKIM	22BE BES3	$\psi(3686) \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

$\dfrac{[\alpha(\Xi^-)\alpha_-(\Lambda) - \overline{\alpha}\overline{\Xi}^+\alpha_+(\overline{\Lambda})]}{[\alpha(\Xi^-)\alpha_-(\Lambda) + \overline{\alpha}\overline{\Xi}^+\alpha_+(\overline{\Lambda})]}$

NODE=S022ACP

This is zero if CP is conserved. The α's are the decay-asymmetry parameters for $\Xi^- \to \Lambda\pi^-$ and $\Lambda \to p\pi^-$ and for $\overline{\Xi}^+ \to \overline{\Lambda}\pi^+$ and $\overline{\Lambda} \to \overline{p}\pi^+$.

NODE=S022ACP

NODE=S022ACP

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$0.0\pm 5.1\pm4.4$	158M	HOLMSTROM 04	HYCP	p Cu, 800 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$+120 \pm140$	252k	LUK 00	E756	p Be, 800 GeV

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

NODE=S022F
NODE=S022F

VALUE (°)	EVTS	DOCUMENT ID		TECN	COMMENT
$-$ 1.5 ± 0.6 OUR AVERAGE					
$-0.92\pm0.69^{+0.23}_{-0.46}$	144k	[1] ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$-2.39\pm0.64\pm0.64$	144M	[2] HUANG	04	HYCP	p Cu, 800 GeV
$-1.61\pm2.66\pm0.37$	1.35M	[3] CHAKRAVO...	03	E756	p Be, 800 GeV
5 ± 10	11k	ASTON	85B	LASS	$K^- p$
14.7 ± 16.0	21k	[4] BENSINGER	85	MPS	5 GeV/c $K^- p$
11 ± 9	4303	BALTAY	74	HBC	1.75 GeV/c $K^- p$
5 ± 16	2436	COOL	74	OSPK	1.8 GeV/c $K^- p$
-14 ± 11	2781	DAUBER	69	HBC	Uses $\alpha_\Lambda = 0.647 \pm 0.020$
0 ± 12	1004	[5] BERGE	66	HBC	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.63\pm1.09\pm0.52$	73k	[6] ABLIKIM	22AD	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$1.32\pm4.24\pm0.17$	5.4k	[7] ABLIKIM	22BE	BES3	$\psi(3686) \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
-26 ± 30	2724	BINGHAM	70B	OSPK	
0 ± 20.4	364	[5] LONDON	66	HBC	Using α_Λ=0.62
54 ± 30	356	[5] CARMONY	64B	HBC	

[1] Converted from radians to degrees. ABLIKIM 22BE reports a value of $(-1.6\pm1.2^{+0.4}_{-0.8})\times 10^{-2}$ radians. NODE=S022F;LINKAGE=C

[2] From this result and α_Ξ, HUANG 04 gets $\beta_\Xi = -0.037 \pm 0.011 \pm 0.010$ and $\gamma_\Xi = 0.888 \pm 0.0004 \pm 0.006$. And the strong p–s phase difference for $\Lambda\pi^-$ scattering is $(4.6 \pm 1.4 \pm 1.2)^\circ$. NODE=S022F;LINKAGE=HU

[3] From this result and α_Ξ, CHAKRAVORTY 03 obtains $\beta_\Xi = -0.025 \pm 0.042 \pm 0.006$ and $\gamma_\Xi = 0.889\pm0.001\pm0.007$. And the strong p–s phase difference for $\Lambda\pi^-$ scattering is $(3.17 \pm 5.28 \pm 0.73)^\circ$. NODE=S022F;LINKAGE=CK

[4] BENSINGER 85 used $\alpha_\Lambda = 0.642 \pm 0.013$. NODE=S022F;LINKAGE=E

[5] The errors have been multiplied by 1.2 due to approximations used for the Ξ polarization; see DAUBER 69 for a discussion. NODE=S022F;LINKAGE=D

[6] Converted from radians to degrees. ABLIKIM 22AD reports a value of $(1.1\pm1.9\pm0.9)\times 10^{-2}$ radians. NODE=S022F;LINKAGE=A

[7] Converted from radians to degrees. ABLIKIM 22BE reports a value of $(2.3\pm7.4\pm0.3)\times 10^{-2}$ radians. NODE=S022F;LINKAGE=B

ϕ_+ ANGLE FOR $\overline{\Xi}^+ \to \overline{\Lambda}\pi^+$ ($\tan\phi = \beta/\gamma$)

NODE=S022F00
NODE=S022F00

VALUE (°)	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.57\pm0.69^{+0.17}_{-0.75}}$	123k	[1] ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$-1.20\pm1.09\pm0.40$	73k	[2] ABLIKIM	22AD	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$-7.05\pm4.18\pm0.23$	5.4k	[3] ABLIKIM	22BE	BES3	$\psi(3686) \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

[1] Converted from radians to degrees. ABLIKIM 22BE reports a value of $(1.0\pm1.2^{+0.3}_{-1.3})\times 10^{-2}$ radians. NODE=S022F00;LINKAGE=C

[2] Converted from radians to degrees. ABLIKIM 22AD reports a value of $(-2.1 \pm 1.9 \pm 0.7) \times 10^{-2}$ radians. NODE=S022F00;LINKAGE=B

[3] Converted from radians to degrees. ABLIKIM 22BE reports a value of $(-12.3 \pm 7.3 \pm 0.4) \times 10^{-2}$ radians. NODE=S022F00;LINKAGE=A

$\Delta\phi_{CP} = (\phi_- + \phi_+)/2$

NODE=S022A02
NODE=S022A02

VALUE (°)	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.17\pm0.46^{+0.17}_{-0.40}}$	267k	[1] ABLIKIM	24AR	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$-0.28\pm0.78\pm0.17$	73k	[2] ABLIKIM	22AD	BES3	$J/\psi \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$
$-2.86\pm2.98\pm0.17$	5.4k	[3] ABLIKIM	22BE	BES3	$\psi(3686) \to \Xi\overline{\Xi} \to \Lambda\overline{\Lambda}\pi\pi$

[1] Converted from radians to degrees. ABLIKIM 22BE reports a value of $(-0.3\pm0.8^{+0.3}_{-0.7})\times 10^{-2}$ radians. NODE=S022A02;LINKAGE=C

[2] Converted from radians to degrees. ABLIKIM 22AD reports a value of $(-0.5 \pm 1.4 \pm 0.3) \times 10^{-2}$ radians. NODE=S022A02;LINKAGE=A

[3] Converted from radians to degrees. ABLIKIM 22BE reports a value of $(-5.0 \pm 5.2 \pm 0.3) \times 10^{-2}$ radians. NODE=S022A02;LINKAGE=B

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

NODE=S022AV

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.25±0.05	1992	[1] BOURQUIN	83	SPEC	SPS hyperon beam

NODE=S022AV

[1] BOURQUIN 83 assumes that $g_2 = 0$. Also, the sign has been changed to agree with our conventions, given in the "Note on Baryon Decay Parameters" in the neutron Listings.

NODE=S022AV;LINKAGE=B

Ξ^- REFERENCES

NODE=S022

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

NODE=S022

ABLIKIM	25CQ	PL B872 140099	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63758
ABLIKIM	24AR	PRL 132 101801	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62716
ABLIKIM	22AD	NAT 606 64	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61849
ABLIKIM	22BE	PR D106 L091101	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61953
ABLIKIM	21AH	PR D104 072007	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61437
ABDALLAH	06E	PL B639 179	J. Abdallah *et al.*	(DELPHI Collab.)	REFID=51265
RAJARAM	05	PRL 94 181801	D. Rajaram *et al.*	(FNAL HyperCP Collab.)	REFID=50592
HOLMSTROM	04	PRL 93 262001	T. Holmstrom *et al.*	(FNAL HyperCP Collab.)	REFID=50365
HUANG	04	PRL 93 011802	M. Huang *et al.*	(FNAL HyperCP Collab.)	REFID=49990
CHAKRAVO...	03	PRL 91 031601	A. Chakravorty *et al.*	(FNAL E756 Collab.)	REFID=49511
LUK	00	PRL 85 4860	K.B. Luk *et al.*	(FNAL E756 Collab.)	REFID=47877
DUBBS	94	PRL 72 808	T. Dubbs *et al.*	(FNAL E761 Collab.)	REFID=43711
DURYEA	92	PRL 68 768	J. Duryea *et al.*	(MINN, FNAL, MICH, RUTG)	REFID=41857
LITTENBERG	92B	PR D46 892	L.S. Littenberg, R.E. Shrock	(BNL, STON)	REFID=42132
HO	90	PRL 65 1713	P.M. Ho *et al.*	(MICH, FNAL, MINN, RUTG)	REFID=41306
Also		PR D44 3402	P.M. Ho *et al.*	(MICH, FNAL, MINN, RUTG)	REFID=41804
TROST	89	PR D40 1703	L.H. Trost *et al.*	(FNAL-715 Collab.)	REFID=40765
BIAGI	87B	ZPHY C35 143	S.F. Biagi *et al.*	(BRIS, CERN, GEVA+)	REFID=40208
RAMEIKA	86	PR D33 3172	R. Rameika *et al.*	(RUTG, MICH, WISC+)	REFID=12076
ASTON	85B	PR D32 2270	D. Aston *et al.*	(SLAC, CARL, CNRC, CINC)	REFID=12073
BENSINGER	85	NP B252 561	J.R. Bensinger *et al.*	(CHIC, ELMT, FNAL+)	REFID=12074
BOURQUIN	84	NP B241 1	M.H. Bourquin *et al.*	(BRIS, GEVA, HEIDP+)	REFID=12071
RAMEIKA	84	PRL 52 581	R. Rameika *et al.*	(RUTG, MICH, WISC+)	REFID=12072
BOURQUIN	83	ZPHY C21 1	M.H. Bourquin *et al.*	(BRIS, GEVA, HEIDP+)	REFID=11823
BIAGI	82	PL 112B 265	S.F. Biagi *et al.*	(BRIS, CAVE, GEVA+)	REFID=12068
BIAGI	82B	PL 112B 277	S.F. Biagi *et al.*	(LOQM, GEVA, RL+)	REFID=12069
CLELAND	80C	PR D21 12	W.E. Cleland *et al.*	(PITT, BNL)	REFID=12066
THOMPSON	80	PR D21 25	J.A. Thompson *et al.*	(PITT, BNL)	REFID=11990
BOURQUIN	79	PL 87B 297	M.H. Bourquin *et al.*	(BRIS, GEVA, HEIDP+)	REFID=12065
HEMINGWAY	78	NP B142 205	R.J. Hemingway *et al.*	(CERN, ZEEM, NIJM+)	REFID=12063
DIBIANCA	75	NP B98 137	F.A. Dibianca, R.J. Endorf	(CMU)	REFID=12062
BALTAY	74	PR D9 49	C. Baltay *et al.*	(COLU, BING) J	REFID=12019
COOL	74	PR D10 792	R.L. Cool *et al.*	(BNL)	REFID=12059
Also		PRL 29 1630	R.L. Cool *et al.*	(BNL)	REFID=12060
YEH	74	PR D10 3545	N. Yeh *et al.*	(BING, COLU)	REFID=12020
MAYEUR	72	NP B47 333	C. Mayeur *et al.*	(BRUX, CERN, TUFTS, LOUC)	REFID=12016
VOTRUBA	72	NP B45 77	M.F. Votruba, A. Safder, T.M. Ratcliffe	(BIRM+)	REFID=12056
WILQUET	72	PL 42B 372	G. Wilquet *et al.*	(BRUX, CERN, TUFTS+)	REFID=12018
DUCLOS	71	NP B32 493	J. Duclos *et al.*	(CERN)	REFID=12054
BINGHAM	70B	PR D1 3010	G.M. Bingham *et al.*	(UCSD, WASH)	REFID=12051
GOLDWASSER	70	PR D1 1960	E.L. Goldwasser, P.F. Schultz	(ILL)	REFID=12052
STONE	70	PL 32B 515	S.L. Stone *et al.*	(ROCH)	REFID=12053
DAUBER	69	PR 179 1262	P.M. Dauber *et al.*	(LRL) J	REFID=11783
SHEN	67	PL 25B 443	B.C. Shen, A. Firestone, G. Goldhaber	(UCB+)	REFID=12045
BERGE	66	PR 147 945	J.P. Berge *et al.*	(LRL)	REFID=12011
CHIEN	66	PR 152 1171	C.Y. Chien *et al.*	(YALE, BNL)	REFID=11771
LONDON	66	PR 143 1034	G.W. London *et al.*	(BNL, SYRA)	REFID=11774
BINGHAM	65	PRSL 285 202	H.H. Bingham	(CERN)	REFID=12038
PJERROU	65B	PRL 14 275	G.M. Pjerrou *et al.*	(UCLA)	REFID=12009
Also		Thesis	G.M. Pjerrou	(UCLA)	REFID=12010
BADIER	64	Dubna Conf. 1 593	J. Badier *et al.*	(EPOL, SACL, ZEEM)	REFID=12036
CARMONY	64B	PRL 12 482	D.D. Carmony *et al.*	(UCLA) J	REFID=12007
HUBBARD	64	PR 135 B183	J.R. Hubbard *et al.*	(LRL)	REFID=11754
FERRO-LUZZI	63	PR 130 1568	M. Ferro-Luzzi *et al.*	(LRL)	REFID=12031
JAUNEAU	63D	Siena Conf. 4	L. Jauneau *et al.*	(EPOL, CERN, LOUC+)	REFID=12032
Also		PL 5 261	L. Jauneau *et al.*	(EPOL, CERN, LOUC+)	REFID=12033
SCHNEIDER	63	PL 4 360	J. Schneider	(CERN)	REFID=12034