



$$I(J^P) = \frac{1}{2}(0^-)$$

K_S^0 MEAN LIFE

For earlier measurements, beginning with BOLDT 58B, see our our 1986 edition, Physics Letters **170B** 130 (1986).

OUR FIT is described in the note on "Fits for K_L^0 CP-Violation Parameters" in the K_L^0 Particle Listings.

<u>VALUE (10^{-10} s)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.8934 ± 0.0008 OUR FIT				
0.8940 ± 0.0009 OUR AVERAGE				
0.8971 ± 0.0021		BERTANZA	97 NA31	
0.8941 ± 0.0014 ± 0.0009		SCHWINGEN...	95 E773	Δm free, $\phi_{+-} = \phi_{SW}$
0.8929 ± 0.0016		GIBBONS	93 E731	
0.8920 ± 0.0044	214k	GROSSMAN	87 SPEC	
0.881 ± 0.009	26k	ARONSON	76 SPEC	
0.8924 ± 0.0032		¹ CARITHERS	75 SPEC	
0.8937 ± 0.0048	6M	GEWENIGER	74B ASPK	
0.8958 ± 0.0045	50k	² SKJEGGEST...	72 HBC	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.905 ± 0.007		³ ARONSON	82B SPEC	
0.867 ± 0.024	2173	⁴ FACKLER	73 OSPK	
0.856 ± 0.008	19994	⁵ DONALD	68B HBC	
0.872 ± 0.009	20000	^{5,6} HILL	68 DBC	
0.866 ± 0.016		⁵ ALFF-...	66B OSPK	
0.843 ± 0.013	5000	⁵ KIRSCH	66 HBC	

¹CARITHERS 75 value is for $m_{K_L^0} - m_{K_S^0}$ $\Delta m = 0.5301 \pm 0.0013$. The Δm dependence of the total decay rate (inverse mean life) is $\Gamma(K_S^0) = [(1.122 \pm 0.004) + 0.16(\Delta m - 0.5348)/\Delta m]10^{10}/s$, or, in terms of meanlife $\tau_S = 0.8913 \pm 0.0032 - 0.238(\Delta m - 0.5348)$ where Δm and τ_S are in units of $10^{10}\hbar s^{-1}$ and $10^{-10}s$ respectively.

²HILL 68 has been changed by the authors from the published value (0.865 ± 0.009) because of a correction in the shift due to η_{+-} . SKJEGGESTAD 72 and HILL 68 give detailed discussions of systematics encountered in this type of experiment.

³ARONSON 82 find that K_S^0 mean life may depend on the kaon energy.

⁴FACKLER 73 does not include systematic errors.

⁵Pre-1971 experiments are excluded from the average because of disagreement with later more precise experiments.

⁶HILL 68 has been changed by the authors from the published value (0.865 ± 0.009) because of a correction in the shift due to η_{+-} . SKJEGGESTAD 72 and HILL 68 give detailed discussions of systematics encountered in this type of experiment.

K_S^0 DECAY MODES

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
$\Gamma_1 \quad \pi^+ \pi^-$	$(68.61 \pm 0.28) \%$	S=1.2
$\Gamma_2 \quad \pi^0 \pi^0$	$(31.39 \pm 0.28) \%$	S=1.2
$\Gamma_3 \quad \pi^+ \pi^- \gamma$	[a,b] $(1.78 \pm 0.05) \times 10^{-3}$	
$\Gamma_4 \quad \gamma \gamma$	$(2.4 \pm 0.9) \times 10^{-6}$	
$\Gamma_5 \quad \pi^+ \pi^- \pi^0$	$(3.2^{+1.2}_{-1.0}) \times 10^{-7}$	
$\Gamma_6 \quad 3\pi^0$	$< 1.9 \times 10^{-5}$	CL=90%
$\Gamma_7 \quad \pi^\pm e^\mp \nu$	[c,d] $(6.70 \pm 0.07) \times 10^{-4}$	S=1.1
$\Gamma_8 \quad \pi^\pm \mu^\mp \nu$	[c,d] $(4.69 \pm 0.06) \times 10^{-4}$	S=1.1

$\Delta S = 1$ weak neutral current (S1) modes

$\Gamma_9 \quad \mu^+ \mu^-$	S1	$< 3.2 \times 10^{-7}$	CL=90%
$\Gamma_{10} \quad e^+ e^-$	S1	$< 1.4 \times 10^{-7}$	CL=90%
$\Gamma_{11} \quad \pi^0 e^+ e^-$	S1	$< 1.1 \times 10^{-6}$	CL=90%

[a] Most of this radiative mode, the low-momentum γ part, is also included in the parent mode listed without γ 's.

[b] See the Particle Listings below for the energy limits used in this measurement.

[c] Calculated from K_L^0 semileptonic rates and the K_S^0 lifetime assuming $\Delta S = \Delta Q$.

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

CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 17 measurements and one constraint to determine 2 parameters. The overall fit has a $\chi^2 = 16.5$ 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.

$$x_2 \begin{vmatrix} & -100 \\ & x_1 \end{vmatrix}$$

K_S^0 DECAY RATES

$\Gamma(\pi^\pm e^\mp \nu)$

Γ_7

VALUE (10^6 s^{-1})	DOCUMENT ID	TECN	COMMENT
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7.50 ± 0.08 OUR EVALUATION Error includes scale factor of 1.1. From K_L^0 measurements, assuming that $\Delta S = \Delta Q$ in K^0 decay so that $\Gamma(K_S^0 \rightarrow \pi^\pm e^\mp \nu) = \Gamma(K_L^0 \rightarrow \pi^\pm e^\mp \nu_e)$.

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

seen	BURGUN	72	HBC	$K^+ p \rightarrow K^0 p \pi^+$
9.3 ± 2.5	AUBERT	65	HLBC	$\Delta S = \Delta Q$, CP cons. not assumed

$\Gamma(\pi^\pm \mu^\mp \nu)$

Γ_8

VALUE (10^6 s^{-1})	DOCUMENT ID
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5.25 ± 0.07 OUR EVALUATION Error includes scale factor of 1.1. From K_L^0 measurements, assuming that $\Delta S = \Delta Q$ in K^0 decay so that $\Gamma(K_S^0 \rightarrow \pi^\pm \mu^\mp \nu) = \Gamma(K_L^0 \rightarrow \pi^\pm \mu^\mp \nu_\mu)$.

K_S^0 BRANCHING RATIOS

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

Γ_1 / Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.6861 ± 0.0028 OUR FIT Error includes scale factor of 1.2.

0.671 ± 0.010 OUR AVERAGE

0.670 ± 0.010	3447	⁷ DOYLE	69	HBC	$\pi^- p \rightarrow \Lambda K^0$
0.70 ± 0.08		COLUMBIA	60B	HBC	
0.68 ± 0.04		CRAWFORD	59B	HBC	

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

0.740 ± 0.024		⁷ ANDERSON	62B	HBC	
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⁷ Anderson result not published, events added to Doyle sample.

$\Gamma(\pi^+ \pi^-) / \Gamma(\pi^0 \pi^0)$

Γ_1 / Γ_2

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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2.186 ± 0.028 OUR FIT Error includes scale factor of 1.2.

2.197 ± 0.026 OUR AVERAGE

2.11 ± 0.09	1315	EVERHART	76	WIRE	$\pi^- p \rightarrow \Lambda K^0$
2.169 ± 0.094	16k	COWELL	74	OSPK	$\pi^- p \rightarrow \Lambda K^0$
2.16 ± 0.08	4799	HILL	73	DBC	$K^+ d \rightarrow K^0 p p$
2.22 ± 0.10	3068	⁸ ALITTI	72	HBC	$K^+ p \rightarrow \pi^+ p K^0$
2.22 ± 0.08	6380	MORSE	72B	DBC	$K^+ n \rightarrow K^0 p$
2.10 ± 0.11	701	⁹ NAGY	72	HLBC	$K^+ n \rightarrow K^0 p$
2.22 ± 0.095	6150	¹⁰ BALTAY	71	HBC	$K p \rightarrow K^0 \text{ neutrals}$
2.282 ± 0.043	7944	¹¹ MOFFETT	70	OSPK	$K^+ n \rightarrow K^0 p$
2.10 ± 0.06	3700	MORFIN	69	HLBC	$K^+ n \rightarrow K^0 p$

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

2.12 ± 0.17	267	⁹ BOZOKI	69	HLBC	
2.285 ± 0.055	3016	¹¹ GOBBI	69	OSPK	$K^+ n \rightarrow K^0 p$

⁸ The directly measured quantity is $K_S^0 \rightarrow \pi^+ \pi^- / \text{all } K^0 = 0.345 \pm 0.005$.

⁹ NAGY 72 is a final result which includes BOZOKI 69.

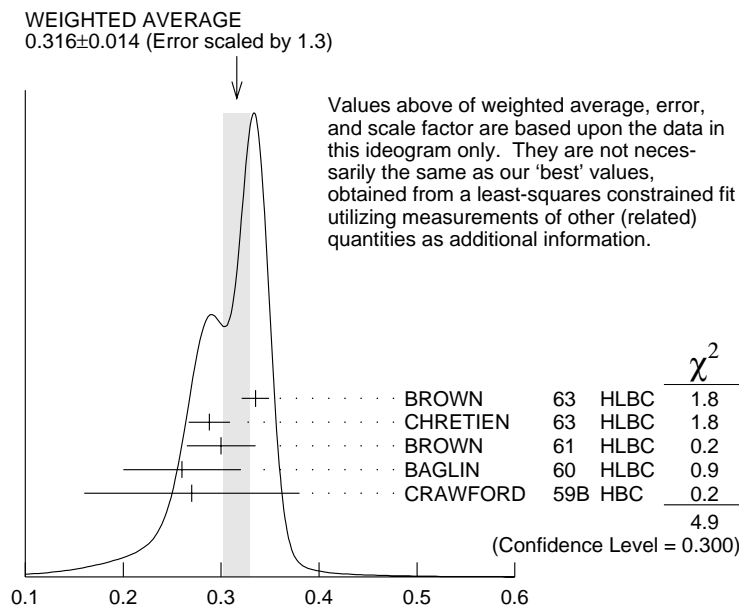
¹⁰ The directly measured quantity is $K_S^0 \rightarrow \pi^+ \pi^- / \text{all } \bar{K}^0 = 0.345 \pm 0.005$.

¹¹ MOFFETT 70 is a final result which includes GOBBI 69.

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

Γ_2 / Γ

VALUE	EVTS	DOCUMENT ID	TECN
0.3139 ± 0.0028 OUR FIT		Error includes scale factor of 1.2.	
0.316 ± 0.014 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.	
0.335 ± 0.014	1066	BROWN	63 HLBC
0.288 ± 0.021	198	CHRETIEN	63 HLBC
0.30 ± 0.035		BROWN	61 HLBC
0.26 ± 0.06		BAGLIN	60 HLBC
0.27 ± 0.11		CRAWFORD	59B HBC



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

$\Gamma(\pi^+ \pi^- \gamma) / \Gamma(\pi^+ \pi^-)$

Γ_3 / Γ_1

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
2.60 ± 0.08 OUR AVERAGE				
2.56 ± 0.09	1286	RAMBERG	93 E731	$p_\gamma > 50 \text{ MeV}/c$
2.68 ± 0.15		¹² TAUREG	76 SPEC	$p_\gamma > 50 \text{ MeV}/c$
2.8 ± 0.6		¹³ BURGUN	73 HBC	$p_\gamma > 50 \text{ MeV}/c$
3.3 ± 1.2	10	WEBBER	70 HBC	$p_\gamma > 50 \text{ MeV}/c$
no ratio given	27	BELLOTTI	66 HBC	$p_\gamma > 50 \text{ MeV}/c$

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

7.10 ± 0.22	3723	RAMBERG	93	E731	$p_\gamma > 20 \text{ MeV}/c$
3.0 ± 0.6	29	¹⁴ BOBISUT	74	HLBC	$p_\gamma > 40 \text{ MeV}/c$

¹² TAUREG 76 find direct emission contribution < 0.06 , CL = 90%.

¹³ BURGUN 73 estimates that direct emission contribution is 0.3 ± 0.6 .

¹⁴ BOBISUT 74 not included in average because p_γ cut differs. Estimates direct emission contribution to be 0.5 or less, CL = 95%.

$\Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
2.4 ± 0.9		35	¹⁵ BARR	95B NA31	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
2.2 ± 1.1		16	¹⁶ BARR	95B NA31	
< 13	90		BALATS	89 SPEC	
2.4 ± 1.2		19	BURKHARDT	87 NA31	
< 133	90		BARMIN	86B XEBC	
< 200	90		VASSERMAN	86 CALO	$\phi \rightarrow K_S^0 K_L^0$
< 400	90	0	BARMIN	73B HLBC	
< 710	90	0	¹⁷ BANNER	72B OSPK	
< 2000	90	0	MORSE	72B DBC	
< 2200	90	0	¹⁷ REPELLIN	71 OSPK	
< 21000	90	0	¹⁷ BANNER	69 OSPK	

¹⁵ BARR 95B quotes this as the combined BARR 95B + BURKHARDT 87 result after rescaling BURKHARDT 87 to use same branching ratios and lifetimes as BARR 95B.

¹⁶ BARR 95B result is calculated using $B(K_L \rightarrow \gamma\gamma) = (5.86 \pm 0.17) \times 10^{-4}$.

¹⁷ These limits are for maximum interference in $K_S^0 - K_L^0$ to 2γ 's.

$\Gamma(\pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (units 10^{-7})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$3.2_{-1.0}^{+1.2}$ OUR AVERAGE					
$2.5_{-1.0-0.6}^{+1.3+0.5}$		500k	¹⁸ ADLER	97B CPLR	
$4.8_{-1.6}^{+2.2} \pm 1.1$			¹⁹ ZOU	96 E621	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$4.1_{-1.9-0.6}^{+2.5+0.5}$			²⁰ ADLER	96E CPLR	Sup. by ADLER 97B
$3.9_{-1.8-0.7}^{+5.4+0.9}$			²¹ THOMSON	94 E621	Sup. by ZOU 96
< 490	90		²² BARMIN	85 HLBC	
< 850	90		METCALF	72 ASPK	

¹⁸ ADLER 97B find the CP -conserving parameters $\text{Re}(\lambda) = (28 \pm 7 \pm 3) \times 10^{-3}$, $\text{Im}(\lambda) = (-10 \pm 8 \pm 2) \times 10^{-3}$. They estimate $B(K_S^0 \rightarrow \pi^+ \pi^- \pi^0)$ from $\text{Re}(\lambda)$ and the K_L^0 decay parameters. See also ANGELOPOULOS 98c.

¹⁹ ZOU 96 is from the the measured quantities $|\rho_{+-0}| = 0.039_{-0.006}^{+0.009} \pm 0.005$ and $\phi_\rho = (-9 \pm 18)^\circ$.

²⁰ ADLER 96E is from the measured quantities $\text{Re}(\lambda) = 0.036 \pm 0.010_{-0.003}^{+0.002}$ and $\text{Im}(\lambda)$ consistent with zero. Note that the quantity λ is the same as ρ_{+-0} used in other footnotes.

²¹ THOMSON 94 calculates this branching ratio from their measurements $|\rho_{+-0}| = 0.035^{+0.019}_{-0.011} \pm 0.004$ and $\phi_\rho = (-59 \pm 48)^\circ$ where $|\rho_{+-0}| e^{i\phi_\rho} = A(K_S^0 \rightarrow \pi^+ \pi^- \pi^0, I = 2)/A(K_L^0 \rightarrow \pi^+ \pi^- \pi^0)$.

²² BARMIN 85 assumes that *CP*-allowed and *CP*-violating amplitudes are equally suppressed.

$\Gamma(3\pi^0)/\Gamma_{\text{total}}$ Γ_6/Γ

<u>VALUE (units 10⁻⁵)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
< 1.9	90	17300	²³ ANGELOPO... 98B	CPLR

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

< 3.7	90		BARMIN	83	HLBC
< 43	90		BARMIN	73	HLBC

²³ ANGELOPOULOS 98B is from $\text{Im}(\eta_{000}) = -0.05 \pm 0.12 \pm 0.05$, assuming $\text{Re}(\eta_{000}) = \text{Re}(\epsilon) = 1.635 \times 10^{-3}$ and using the value $B(K_L^0 \rightarrow \pi^0 \pi^0 \pi^0) = 0.2112 \pm 0.0027$.

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

Test for $\Delta S = 1$ weak neutral current. Allowed by first-order weak interaction combined with electromagnetic interaction.

<u>VALUE (units 10⁻⁵)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
< 0.032	90	GJESDAL	73 ASPK

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

< 14	90	BOHM	69 OSPK
< 0.7	90	HYAMS	69B OSPK
< 22	90	²⁴ STUTZKE	69 OSPK
< 7	90	BOTT-...	67 OSPK

²⁴ Value calculated by us, using 2.3 instead of 1 event, 90% CL.

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

Test for $\Delta S = 1$ weak neutral current. Allowed by first-order weak interaction combined with electromagnetic interaction.

<u>VALUE (units 10⁻⁷)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
< 1.4	90		ANGELOPO... 97	CPLR	

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

< 28	90	0	BLICK	94	CNTR	Hyperon facility
< 100	90		BARMIN	86	XEBC	
< 1100	90		BITSADZE	86	CALO	
< 3400	90		BOHM	69	OSPK	

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

Test for $\Delta S = 1$ weak neutral current. Allowed by first-order weak interaction combined with electromagnetic interaction.

<u>VALUE (units 10⁻⁶)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>
< 1.1	90	0	BARR	93B NA31

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

< 45	90		GIBBONS	88	E731
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CP-VIOLATION PARAMETERS IN K_S^0 DECAY

$$\text{Im}(\eta_{+-0})^2 = \Gamma(K_S^0 \rightarrow \pi^+ \pi^- \pi^0, \text{CP-violating}) / \Gamma(K_L^0 \rightarrow \pi^+ \pi^- \pi^0)$$

CPT assumed valid (i.e. $\text{Re}(\eta_{+-0}) \simeq 0$).

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

<0.23	90	601	²⁵ BARMIN	85	HLBC
<1.2	90	192	BALDO-...	75	HLBC
<0.71	90	148	MALLARY	73	OSPK Re(A) = -0.05 ± 0.17
<0.66	90	180	JAMES	72	HBC
<1.2	90	99	JONES	72	OSPK
<0.12	90	384	METCALF	72	ASPK
<1.2	90	99	CHO	71	DBC
<1.0	90	98	JAMES	71	HBC Incl. in JAMES 72
<1.2	95	50	²⁶ MEISNER	71	HBC CL=90% not avail.
<0.8	90	71	WEBBER	70	HBC
<0.45	90		BEHR	66	HLBC
<3.8	90	18	ANDERSON	65	HBC Incl. in WEBBER 70

²⁵ BARMIN 85 find $\text{Re}(\eta_{+-0}) = (0.05 \pm 0.17)$ and $\text{Im}(\eta_{+-0}) = (0.15 \pm 0.33)$. Includes events of BALDO-CEOLIN 75.

²⁶ These authors find $\text{Re}(A) = 2.75 \pm 0.65$, above value at $\text{Re}(A) = 0$.

$$\text{Im}(\eta_{+-0}) = \text{Im}(A(K_S^0 \rightarrow \pi^+ \pi^- \pi^0, \text{CP-violating}) / A(K_L^0 \rightarrow \pi^+ \pi^- \pi^0))$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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-0.002 ± 0.009 -0.001	500k	²⁷ ADLER	97B	CPLR
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$-0.002 \pm 0.018 \pm 0.003$	137k	²⁸ ADLER	96D	CPLR Sup. by ADLER 97B
$-0.015 \pm 0.017 \pm 0.025$	272k	²⁹ ZOU	94	SPEC

²⁷ ADLER 97B also find $\text{Re}(\eta_{+-0}) = -0.002 \pm 0.007$
 -0.001 . See also ANGELOPOULOS 98C.

²⁸ The ADLER 96D fit also yields $\text{Re}(\eta_{+-0}) = 0.006 \pm 0.013 \pm 0.001$ with a correlation +0.66 between real and imaginary parts. Their results correspond to $|\eta_{+-0}| < 0.037$ with 90% CL.

²⁹ ZOU 94 use theoretical constraint $\text{Re}(\eta_{+-0}) = \text{Re}(\epsilon) = 0.0016$. Without this constraint they find $\text{Im}(\eta_{+-0}) = 0.019 \pm 0.061$ and $\text{Re}(\eta_{+-0}) = 0.019 \pm 0.027$.

$$\text{Im}(\eta_{000})^2 = \Gamma(K_S^0 \rightarrow 3\pi^0) / \Gamma(K_L^0 \rightarrow 3\pi^0)$$

CPT assumed valid (i.e. $\text{Re}(\eta_{000}) \simeq 0$). This limit determines branching ratio $\Gamma(3\pi^0) / \Gamma_{\text{total}}$ above.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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<0.1	90	632	³⁰ BARMIN	83	HLBC
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• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.28	90		³¹ GJESDAL	74B	SPEC Indirect meas.
<1.2	90	22	BARMIN	73	HLBC

³⁰ BARMIN 83 find $\text{Re}(\eta_{000}) = (-0.08 \pm 0.18)$ and $\text{Im}(\eta_{000}) = (-0.05 \pm 0.27)$. Assuming *CPT* invariance they obtain the limit quoted above.

³¹ GJESDAL 74B uses $K_{2\pi}$, $K_{\mu 3}$, and K_{e3} decay results, unitarity, and *CPT*. Calculates $|\eta_{000}| = 0.26 \pm 0.20$. We convert to upper limit.

$$\text{Im}(\eta_{000}) = \text{Im}(A(K_S^0 \rightarrow \pi^0 \pi^0 \pi^0)/A(K_L^0 \rightarrow \pi^0 \pi^0 \pi^0))$$

$K_S^0 \rightarrow \pi^0 \pi^0 \pi^0$ violates CP conservation, in contrast to $K_S^0 \rightarrow \pi^+ \pi^- \pi^0$ which has a CP -conserving part.

VALUE	EVTS	DOCUMENT ID	TECN
$-0.05 \pm 0.12 \pm 0.05$	17300	³² ANGELOPO... 98B	CPLR

³² ANGELOPOULOS 98B assumes $\text{Re}(\eta_{000}) = \text{Re}(\epsilon) = 1.635 \times 10^{-3}$. Without assuming CPT invariance, they obtain $\text{Re}(\eta_{000}) = 0.18 \pm 0.14 \pm 0.06$ and $\text{Im}(\eta_{000}) = 0.15 \pm 0.20 \pm 0.03$.

K_S^0 REFERENCES

ANGELOPO...	98B	PL B425 391	A. Angelopoulos+	(CPLEAR Collab.)
ANGELOPO...	98C	EPJ C5 389	A. Angelopoulos+	(CPLEAR Collab.)
ADLER	97B	PL B407 193	R. Adler+	(CPLEAR Collab.)
ANGELOPO...	97	PL B413 232	A. Angelopoulos+	(CPLEAR Collab.)
BERTANZA	97	ZPHY C73 629	L. Bertanza (PISA, CERN, EDIN, MANZ, ORSAY, SIEG)	
ADLER	96D	PL B370 167	+Alhalel, Angelopoulos+	(CPLEAR Collab.)
ADLER	96E	PL B374 313	+Alhalel, Angelopoulos+	(CPLEAR Collab.)
ZOU	96	PL B369 362	+Beretvas, Caracappa+	(RUTG, MINN, MICH)
BARR	95B	PL B351 579	+Buchholz+ (CERN, EDIN, MANZ, LALO, PISA, SIEG)	
SCHWINGEN...	95	PRL 74 4376	Schwingenheuer+ (EFI, CHIC, ELMT, FNAL, ILL, RUTG)	
BLICK	94	PL B334 234	+Kolosov, Kutjin, Shelikov+	(SERP, JINR)
THOMSON	94	PL B337 411	+Zou, Beretvas, Caracappa, Devlin+	(RUTG, MINN, MICH)
ZOU	94	PL B329 519	+Beretvas, Caracappa, Devlin+	(RUTG, MINN, MICH)
BARR	93B	PL B304 381	+Buchholz+ (CERN, EDIN, MANZ, LALO, PISA, SIEG)	
GIBBONS	93	PRL 70 1199	+Barker, Briere, Makoff+	(FNAL E731 Collab.)
Also	97	PR D55 6625	L.K. Gibbons+	(FNAL E731 Collab.)
RAMBERG	93	PRL 70 2525	+Bock, Coleman, Enagonio, Hsiung+	(FNAL E731 Collab.)
BALATS	89	SJNP 49 828	+Berezin, Bogdanov, Vishnevskii, Vishnyakov+	(ITEP)
		Translated from YAF 49 1332.		
GIBBONS	88	PRL 61 2661	+Papadimitriou+	(FNAL E731 Collab.)
BURKHARDT	87	PL B199 139	+ (CERN, EDIN, MANZ, LALO, PISA, SIEG)	
GROSSMAN	87	PRL 59 18	+Heller, James, Shupe+	(MINN, MICH, RUTG)
BARMIN	86	SJNP 44 622	+Barylov, Davidenko, Demidov+	(ITEP)
		Translated from YAF 44 965.		
BARMIN	86B	NC 96A 159	+Barylov, Chistyakova, Chuvilo+	(ITEP, PADO)
BITSADZE	86	PL 167B 138	+Budagov (CMNS, SOFI, SERP, TBIL, JINR, BAKU+)	
PDG	86B	PL 170B 130	Aguilar-Benitez, Porter+	(CERN, CIT+)
VASSERMAN	86	JETPL 43 588	+Golubev, Gluskin, Druzhinin+	(NOVO)
		Translated from ZETFP 43 457.		
BARMIN	85	NC 85A 67	+Barylov, Chistyakova, Chuvilo+	(ITEP, PADO)
Also	85B	SJNP 41 759	Barmin, Barylov, Volkov+	(ITEP)
		Translated from YAF 41 1187.		
BARMIN	83	PL 128B 129	+Barylov, Chistyakova, Chuvilo+	(ITEP, PADO)
Also	84	SJNP 39 269	Barmin, Barylov, Golubchikov+	(ITEP, PADO)
		Translated from YAF 39 428.		
ARONSON	82	PRL 48 1078	+Bernstein+	(BNL, CHIC, STAN, WISC)
ARONSON	82B	PRL 48 1306	+Bock, Cheng, Fischbach	(BNL, CHIC, PURD)
Also	82B	PL 116B 73	Fischbach, Cheng+	(PURD, BNL, CHIC)
Also	83	PR D28 476	Aronson, Bock, Cheng+	(BNL, CHIC, PURD)
Also	83B	PR D28 495	Aronson, Bock, Cheng+	(BNL, CHIC, PURD)
ARONSON	76	NC 32A 236	+McIntyre, Roehrig+	(WISC, EFI, UCSD, ILLC)
EVERHART	76	PR D14 661	+Kraus, Lande, Long, Lowenstein+	(PENN)
TAUREG	76	PL 65B 92	+Zech, Dydak, Navarra+	(HEIDH, CERN, DORT)
BALDO-...	75	NC 25A 688	Baldo-Ceolin, Bobisut, Calimani+	(PADO, WISC)
CARITHERS	75	PRL 34 1244	+Modis, Nygren, Pun+	(COLU, NYU)
BOBISUT	74	LNC 11 646	+Huzita, Mattioli, Puglierin	(PADO)
COWELL	74	PR D10 2083	+Lee-Franzini, Orcutt, Franzini+	(STON, COLU)
GEWENIGER	74B	PL 48B 487	+Gjesdal, Presser+	(CERN, HEIDH)
GJESDAL	74B	PL 52B 119	+Presser, Steffen+	(CERN, HEIDH)
BARMIN	73	PL 46B 465	+Barylov, Davidenko, Demidov+	(ITEP)
BARMIN	73B	PL 47B 463	+Barylov, Davidenko, Demidov+	(ITEP)
BURGUN	73	PL 46B 481	+Bertranet, Lesquoy, Muller, Pauli+	(SACL, CERN)
FACKLER	73	PRL 31 847	+Frisch, Martin, Smoot, Sompayrac	(MIT)
GJESDAL	73	PL 44B 217	+Presser, Steffen, Steinberger+	(CERN, HEIDH)

HILL	73	PR D8 1290	+Sakitt, Samios, Burris, Engler+	(BNL, CMU)
MALLARY	73	PR D7 1953	+Binnie, Gallivan, Gomez, Peck, Sciulli+	(CIT)
ALITTI	72	PL 39B 568	+Lesquoy, Muller	(SACL)
BANNER	72B	PRL 29 237	+Cronin, Hoffman, Knapp, Shochet	(PRIN)
BURGUN	72	NP B50 194	+Lesquoy, Muller, Pauli+	(SACL, CERN, OSLO)
JAMES	72	NP B49 1	+Montanet, Paul, Saetre+	(CERN, SACL, OSLO)
JONES	72	NC 9A 151	+Abashian, Graham, Mantsch, Orr, Smith+	(ILL)
METCALF	72	PL 40B 703	+Neuhofer, Niebergall+	(CERN, IPN, WIEN)
MORSE	72B	PRL 28 388	+Nauenberg, Bierman, Sager+	(COLO, PRIN, UMD)
NAGY	72	NP B47 94	+Telbisz, Vestergombi	(BUDA)
Also	69	PL 30B 498	Bozoki, Fenyves, Gombosi, Nagy+	(BUDA)
SKJEGGEST...	72	NP B48 343	Skjeggstad, James+	(OSLO, CERN, SACL)
BALTAY	71	PRL 27 1678	+Bridgewater, Cooper, Gershwin, Habibi+	(COLU)
Also	71	Thesis Nevis 187	Cooper	(COLU)
CHO	71	PR D3 1557	+Dralle, Canter, Engler, Fisk+	(CMU, BNL, CASE)
JAMES	71	PL 35B 265	+Montanet, Paul, Pauli+	(CERN, SACL, OSLO)
MEISNER	71	PR D3 59	+Mann, Hertzbach, Kofler+	(MASA, BNL, YALE)
REPELLIN	71	PL 36B 603	+Wolff, Chollet, Gaillard, Jane+	(ORSAY, CERN)
MOFFETT	70	BAPS 15 512	+Gobbi, Green, Hakel, Rosen	(ROCH)
WEBBER	70	PR D1 1967	+Solmitz, Crawford, Alston-Garnjost	(LRL)
Also	69	Thesis UCRL 19226	Webber	(LRL)
BANNER	69	PR 188 2033	+Cronin, Liu, Pilcher	(PRIN)
BOHM	69	Thesis		(AACH)
BOZOKI	69	PL 30B 498	+Fenyves, Gombosi, Nagy+	(BUDA)
DOYLE	69	Thesis UCRL 18139		(LRL)
GOBBI	69	PRL 22 682	+Green, Hakel, Moffett, Rosen+	(ROCH)
HYAMS	69B	PL 29B 521	+Koch, Potter, VonLindern, Lorenz+	(CERN, MPIM)
MORFIN	69	PRL 23 660	+Sinclair	(MICH)
STUTZKE	69	PR 177 2009	+Abashian, Jones, Mantsch, Orr, Smith	(ILL)
DONALD	68B	PL 27B 58	+Edwards, Nisar+	(LIVP, CERN, IPNP, CDEF)
HILL	68	PR 171 1418	+Robinson, Sakitt+	(BNL, CMU)
BOTT-...	67	PL 24B 194	Bott-Bodenhausen, DeBouard, Cassel+	(CERN)
ALFF-...	66B	PL 21 595	Alff-Steinberger, Heuer, Kleinknecht+	(CERN)
BEHR	66	PL 22 540	+Brisson, Petiau+	(EPOL, MILA, PADO, ORSAY)
BELLOTTI	66	NC 45A 737	+Pullia, Baldo-Ceolin+	(MILA, PADO)
KIRSCH	66	PR 147 939	+Schmidt	(COLU)
ANDERSON	65	PRL 14 475	+Crawford, Golden, Stern, Binford+	(LRL, WISC)
AUBERT	65	PL 17 59	+Behr, Canavan, Chounet+	(EPOL, ORSAY)
BROWN	63	PR 130 769	+Kadyk, Trilling, Roe+	(LRL, MICH)
CHRETIEN	63	PR 131 2208	+	(BRAN, BROW, HARV, MIT)
ANDERSON	62B	CERN Conf. 836	+Crawford+	(LRL)
BROWN	61	NC 19 1155	+Bryant, Burnstein, Glaser, Kadyk+	(MICH)
BAGLIN	60	NC 18 1043	+Bloch, Brisson, Hennessy+	(EPOL)
COLUMBIA	60B	Rochester Conf. 727	Schwartz+	(COLU)
CRAWFORD	59B	PRL 2 266	+Cresti, Douglass, Good, Ticho+	(LRL)
BOLDT	58B	PRL 1 150	+Caldwell, Pal	(MIT)

OTHER RELATED PAPERS

LITTENBERG	93	ARNPS 43 729	+Valencia	(BNL, FNAL)
Rare and Radiative Kaon Decays				
BATTISTON	92	PRPL 214 293	+Cocolicchio, Fogli, Paver	(PGIA, CERN, TRSTT)
Status and Perspectives of <i>K</i> Decay Physics				
TRILLING	65B	UCRL 16473		(LRL)
Updated from 1965 Argonne Conference, page 115.				
CRAWFORD	62	CERN Conf. 827		(LRL)
FITCH	61	NC 22 1160	+Piroue, Perkins	(PRIN, LASL)
GOOD	61	PR 124 1223	+Matsen, Muller, Piccioni+	(LRL)
BIRGE	60	Rochester Conf. 601	+Ely+	(LRL, WISC)
MULLER	60	PRL 4 418	+Birge, Fowler, Good, Piccioni+	(LRL, BNL)