K^0_S

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

K^0_S 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^0_L *CP*-Violation Parameters" in the K^0_L Particle Listings.

The FITS given below are from the 2002 edition and do NOT include the new data which are indicated by the change bars at the right.

VALUE (10^{-10} s)	EVTS	DOCUMENT ID		TECN	COMMENT
0.8935 ±0.0008 OUR FIT	Assuming *CPT*				
0.8937 ±0.0012 OUR FIT	Not assuming *CPT*				
0.8965 ±0.0007		[1] ALAVI-HARATI	03	KTEV	Δm free, $\phi_{+-} = \phi_{SW}$
0.8958 ±0.0013		[2] ALAVI-HARATI	03	KTEV	Δm, ϕ_{+-} free
0.89598±0.00048±0.00051	16M	LAI	02C	NA48	
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	Δm free, $\phi_{+-}=\phi_{SW}$
0.8920 ±0.0044	214k	GROSSMAN	87	SPEC	
0.8924 ±0.0032 ±0.0002		[3] CARITHERS	75	SPEC	
0.8937 ±0.0048	6M	GEWENIGER	74B	ASPK	
0.8958 ±0.0045	50k	[4] SKJEGGEST...	72	HBC	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.905 ±0.007		[5] ARONSON	82B	SPEC	
0.881 ±0.009	26k	ARONSON	76	SPEC	
0.856 ±0.008	19994	[6] DONALD	68B	HBC	
0.872 ±0.009	20000	[6,7] HILL	68	DBC	

[1] ALAVI-HARATI 03 τ_s is correlated with their $\Delta m = m_{K^0_L} - m_{K^0_S}$ measurement in the K^0_L listings. The correlation coefficient $\rho(\tau_s,\Delta m) = -0.396$.

[2] ALAVI-HARATI 03 fit Δm, ϕ_{+-}, and τ_{K_S} simultaneously. See ϕ_{+-} in the "K_L *CP* violation" section for correlation information. *CPT* is not assumed.

[3] CARITHERS 75 measures the Δm dependence of the total decay rate (inverse mean life) to be $\Gamma(K^0_S) = \left[(1.122 \pm 0.004) + 0.16(\Delta m - 0.5348)/\Delta m\right] 10^{10}$/s, or, in terms of mean life, CARITHERS 75 measures $\tau_s = (0.8913 \pm 0.0032) - 0.238\,[\Delta m - 0.5348]$ (10^{-10} s). We have adjusted the measurement to use our best values of (Δm = 0.5303 ± 0.0009) (10^{10} $\hbar$ s^{-1}). Our first error is their experiment's error and our second error is the systematic error from using our best values.

[4] HILL 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.

[5] ARONSON 82 find that K^0_S mean life may depend on the kaon energy.

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

[7] HILL 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^0_S DECAY MODES

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
	Hadronic modes			
Γ_1	$\pi^0\pi^0$		(31.05 ± 0.14) %	S=1.1
Γ_2	$\pi^+\pi^-$		(68.95 ± 0.14) %	S=1.1
Γ_3	$\pi^+\pi^-\pi^0$		$(3.2\ ^{+1.2}_{-1.0}) \times 10^{-7}$	
	Modes with photons or $\ell\overline{\ell}$ pairs			
Γ_4	$\pi^+\pi^-\gamma$	[*a*,*b*]	$(1.79\pm0.05) \times 10^{-3}$	
Γ_5	$\pi^+\pi^-e^+e^-$		$(4.5\ \pm0.8\ ) \times 10^{-5}$	
Γ_6	$\gamma\gamma$		$(2.77\pm0.07) \times 10^{-6}$	
	Semileptonic modes			
Γ_7	$\pi^\pm e^\mp \nu_e$	[*c*]	$(6.9\ \pm0.4\ ) \times 10^{-4}$	
Γ_8	$\pi^\pm \mu^\mp \nu_\mu$	[*c*]		
	***CP* violating (*CP*) and $\Delta S = 1$ weak neutral current (*S1*) modes**			
Γ_9	$3\pi^0$	*CP*	$< 1.4 \times 10^{-5}$	CL=90%
Γ_{10}	$\mu^+\mu^-$	*S1*	$< 3.2 \times 10^{-7}$	CL=90%
Γ_{11}	e^+e^-	*S1*	$< 1.4 \times 10^{-7}$	CL=90%
Γ_{12}	$\pi^0 e^+e^-$	*S1*	$< 1.4 \times 10^{-7}$	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*] 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 14 measurements and one constraint to determine 2 parameters. The overall fit has a $\chi^2 =$ 18.8 for 13 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	−100
	x_1

K^0_S DECAY RATES

$\Gamma(\pi^\pm e^\mp \nu_e)$ — Γ_7

VALUE (10^6 s^{-1})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
8.1 ±1.6	75	[8] AKHMETSHIN	99	CMD2	Tagged K^0_S using $\phi \rightarrow K^0_L K^0_S$
7.50±0.08		[9] PDG	98		
seen		BURGUN	72	HBC	$K^+ p \rightarrow K^0 p \pi^+$
9.3 ±2.5		AUBERT	65	HLBC	ΔS=ΔQ, *CP* cons. not assumed

[8] AKHMETSHIN 99 is from a measured branching ratio B($K^0_S \rightarrow \pi e \nu_e$)= $(7.2 \pm 1.4) \times 10^{-4}$ and $\tau_{K^0_S} = (0.8934 \pm 0.0008) \times 10^{-10}$ s. Not independent of measured branching ratio.

[9] PDG 98 from K^0_L measurements, assuming that ΔS=ΔQ in K^0 decay so that $\Gamma(K^0_S \rightarrow \pi^\pm e^\mp \nu_e) = \Gamma(K^0_L \rightarrow \pi^\pm e^\mp \nu_e)$.

$\Gamma(\pi^\pm \mu^\mp \nu_\mu)$ — Γ_8

VALUE (10^6 s^{-1})	DOCUMENT ID	
• • • We do not use the following data for averages, fits, limits, etc. • • •		
5.25±0.07	[10] PDG	98

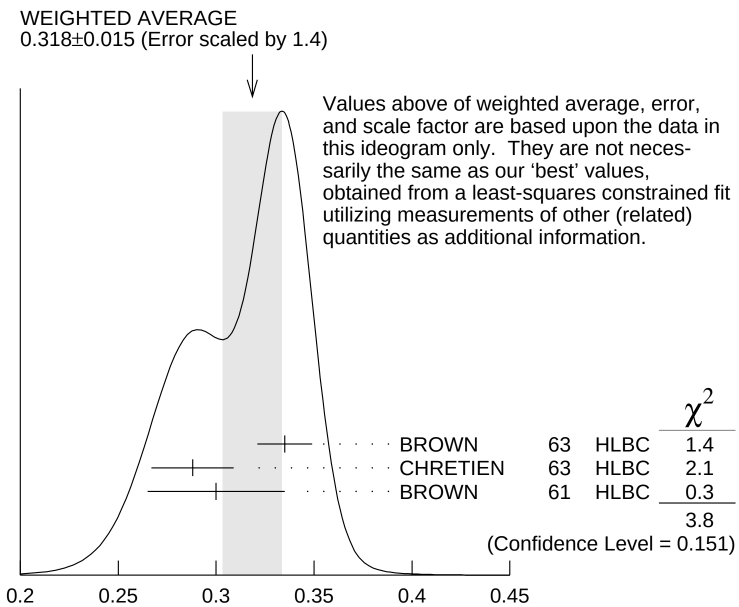
[10] PDG 98 from K^0_L measurements, assuming that ΔS=ΔQ in K^0 decay so that $\Gamma(K^0_S \rightarrow \pi^\pm \mu^\mp \nu_\mu) = \Gamma(K^0_L \rightarrow \pi^\pm \mu^\mp \nu_\mu)$.

K^0_S BRANCHING RATIOS

—— Hadronic modes ——

$\Gamma(\pi^0\pi^0)/\Gamma_{total}$ Γ_1/Γ

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*
0.3105±0.0014 OUR FIT Error includes scale factor of 1.1.				
0.318 ±0.015 OUR AVERAGE Error includes scale factor of 1.4. 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



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

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ Γ_2/Γ

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.6895±0.0014 OUR FIT Error includes scale factor of 1.1.					
0.670 ±0.010	3447	DOYLE	69	HBC	$\pi^- p \rightarrow \Lambda K^0$

$\Gamma(\pi^+\pi^-)/\Gamma(\pi^0\pi^0)$ Γ_2/Γ_1

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.221±0.014 OUR FIT Error includes scale factor of 1.1.					
2.225±0.014 OUR AVERAGE Error includes scale factor of 1.1.					
2.236±0.003±0.015	766k	ALOISIO	02B	KLOE	Incl. Rad. Decays $(\pi^+\pi^-\gamma)$
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	[11] ALITTI	72	HBC	$K^+ p \to \pi^+ p K^0$
2.22 ±0.08	6380	MORSE	72B	DBC	$K^+ n \to K^0 p$
2.10 ±0.11	701	[12] NAGY	72	HLBC	$K^+ n \to K^0 p$
2.22 ±0.095	6150	[13] BALTAY	71	HBC	$K p \to K^0$ neutrals
2.282±0.043	7944	[14] MOFFETT	70	OSPK	$K^+ n \to K^0 p$
2.10 ±0.06	3700	MORFIN	69	HLBC	$K^+ n \to K^0 p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.12 ±0.17	267	[12] BOZOKI	69	HLBC	
2.285±0.055	3016	[14] GOBBI	69	OSPK	$K^+ n \to K^0 p$

[11] The directly measured quantity is $K^0_S \to \pi^+\pi^-$/all K^0 = 0.345 ± 0.005.
[12] NAGY 72 is a final result which includes BOZOKI 69.
[13] The directly measured quantity is $K^0_S \to \pi^+\pi^-$/all $\overline{K}^0$ = 0.345 ± 0.005.
[14] MOFFETT 70 is a final result which includes GOBBI 69.

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_3/Γ

VALUE (units 10^{-7})	EVTS	DOCUMENT ID		TECN	COMMENT
$3.2^{+1.2}_{-1.0}$ OUR AVERAGE					
$2.5^{+1.3+0.5}_{-1.0-0.6}$	500k	[15] ADLER	97B	CPLR	
$4.8^{+2.2}_{-1.6}\pm1.1$		[16] ZOU	96	E621	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$4.1^{+2.5+0.5}_{-1.9-0.6}$		[17] ADLER	96E	CPLR	Sup. by ADLER 97B
$3.9^{+5.4+0.9}_{-1.8-0.7}$		[18] THOMSON	94	E621	Sup. by ZOU 96

[15] ADLER 97B find the CP-conserving parameters Re(λ) = (28 ± 7 ± 3) × 10^{-3}, Im(λ) = (−10 ± 8 ± 2) × 10^{-3}. They estimate B($K^0_S \to \pi^+\pi^-\pi^0$) from Re($\lambda$) and the K^0_L decay parameters. See also ANGELOPOULOS 98C.
[16] ZOU 96 is from the the measured quantities $|\rho_{+-0}| = 0.039^{+0.009}_{-0.006} \pm 0.005$ and $\phi_\rho = (-9 \pm 18)^\circ$.
[17] ADLER 96E is from the measured quantities Re(λ) = $0.036 \pm 0.010^{+0.002}_{-0.003}$ and Im(λ) consistent with zero. Note that the quantity λ is the same as ρ_{+-0} used in other footnotes.
[18] THOMSON 94 calculates this branching ratio from their measurements $|\rho_{+-0}| = 0.035^{+0.019}_{-0.011} \pm 0.004$ and $\phi_\rho = (-59\pm48)^\circ$ where $|\rho_{+-0}|e^{i\phi_\rho}$ = A($K^0_S \to \pi^+\pi^-\pi^0$, $I=2$)/A($K^0_L \to \pi^+\pi^-\pi^0$).

Modes with photons or $\ell\overline{\ell}$ pairs

$\Gamma(\pi^+\pi^-\gamma)/\Gamma(\pi^+\pi^-)$ — Γ_4/Γ_2

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.60±0.08 OUR AVERAGE					
2.56±0.09	1286	RAMBERG	93	E731	p_γ >50 MeV/c
2.68±0.15		[19] TAUREG	76	SPEC	p_γ >50 MeV/c
2.8 ±0.6		[20] BURGUN	73	HBC	p_γ >50 MeV/c
• • • We do not use the following data for averages, fits, limits, etc. • • •					
7.10±0.22	3723	RAMBERG	93	E731	p_γ >20 MeV/c
3.0 ±0.6	29	[21] BOBISUT	74	HLBC	p_γ >40 MeV/c

[19] TAUREG 76 find direct emission contribution <0.06, CL = 90%.
[20] BURGUN 73 estimates that direct emission contribution is 0.3 ± 0.6.
[21] BOBISUT 74 not included in average because p_γ cut differs. Estimates direct emission contribution to be 0.5 or less, CL = 95%.

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

VALUE (units 10^{-5})	EVTS	DOCUMENT ID		TECN
4.5±0.7±0.4	56	LAI	00B	NA48

$\Gamma(\gamma\gamma)/\Gamma_{total}$ Γ_6/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN
2.77±0.07 OUR AVERAGE					
2.78±0.06±0.04		7.5k	[22] LAI	03	NA48
2.58±0.36±0.22		149	LAI	00	NA48
2.4 ±0.9		35	[23] BARR	95B	NA31
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.2 ±1.1		16	[24] BARR	95B	NA31
< 13	90		BALATS	89	SPEC
2.4 ±1.2		19	BURKHARDT	87	NA31
<133	90		BARMIN	86B	XEBC

[22] LAI 03 uses PDG 00 value of B($K^0_S \to \pi^0\pi^0$).
[23] 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.
[24] BARR 95B result is calculated using B($K_L \to \gamma\gamma$) = (5.86 ± 0.17) × 10^{-4}.

Semileptonic modes

$\Gamma(\pi^\pm e^\mp \nu_e)/\Gamma_{total}$ Γ_7/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
6.9 ±0.4 OUR AVERAGE					
6.91±0.34±0.15	624	[25] ALOISIO	02	KLOE	Tagged K^0_S using $\phi \to K^0_L K^0_S$
7.2 ±1.4	75	AKHMETSHIN	99	CMD2	Tagged K^0_S using $\phi \to K^0_L K^0_S$

[25] Uses the PDG 00 value for B($K^0_S \to \pi^+\pi^-$).

CP violating (*CP*) and $\Delta S = 1$ weak neutral current (*S1*) modes

$\Gamma(3\pi^0)/\Gamma_{total}$ Γ_9/Γ

Violates *CP* conservation.

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN
<1.4	90	7M	ACHASOV	99D	SND
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.9	90	17300	[26] ANGELOPO...	98B	CPLR
<3.7	90		BARMIN	83	HLBC

[26] ANGELOPOULOS 98B is from Im(η_{000}) = −0.05 ± 0.12 ± 0.05, assuming Re(η_{000}) = Re(ϵ) = 1.635 × 10^{-3} and using the value B($K^0_L \to \pi^0\pi^0\pi^0$) = 0.2112 ± 0.0027.

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

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

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN
<0.032	90	GJESDAL	73	ASPK
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.7	90	HYAMS	69B	OSPK

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

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

VALUE (units 10^{-7})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
< 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	

$\Gamma(\pi^0 e^+e^-)/\Gamma_{\text{total}}$ — Γ_{12}/Γ

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

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN
< 0.14	90		LAI	01	NA48
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 1.1	90	0	BARR	93B	NA31
<45	90		GIBBONS	88	E731

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CP-VIOLATION PARAMETERS IN K^0_S DECAY

$\text{Im}(\eta_{+-0})^2 = \Gamma(K^0_S \to \pi^+\pi^-\pi^0$, CP-violating$)$ / $\Gamma(K^0_L \to \pi^+\pi^-\pi^0)$

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.23	90	601	[27] BARMIN	85	HLBC
<0.12	90	384	METCALF	72	ASPK

[27] 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.

$\text{Im}(\eta_{+-0}) = \text{Im}(\text{A}(K^0_S \to \pi^+\pi^-\pi^0$, CP-violating$)$ / $\text{A}(K^0_L \to \pi^+\pi^-\pi^0))$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.002 \pm 0.009^{+0.002}_{-0.001}}$	500k	[28] ADLER	97B	CPLR	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$-0.002 \pm 0.018 \pm 0.003$	137k	[29] ADLER	96D	CPLR	Sup. by ADLER 97B
$-0.015 \pm 0.017 \pm 0.025$	272k	[30] ZOU	94	SPEC	

[28] ADLER 97B also find Re(η_{+-0}) = $-0.002 \pm 0.007^{+0.004}_{-0.001}$. See also ANGELOPOULOS 98C.

[29] The ADLER 96D fit also yields Re(η_{+-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.

[30] ZOU 94 use theoretical constraint Re(η_{+-0}) = Re(ϵ) = 0.0016. Without this constraint they find Im(η_{+-0}) = 0.019 ± 0.061 and Re(η_{+-0}) = 0.019 ± 0.027.

Im(η_{000})^2 = $\Gamma(K^0_S \to 3\pi^0)$ / $\Gamma(K^0_L \to 3\pi^0)$

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

VALUE	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.1	90	632	[31] BARMIN	83	HLBC	
<0.28	90		[32] GJESDAL	74B	SPEC	Indirect meas.

[31] BARMIN 83 find Re(η_{000}) = (-0.08 ± 0.18) and Im(η_{000}) = (-0.05 ± 0.27). Assuming *CPT* invariance they obtain the limit quoted above.

[32] GJESDAL 74B uses $K2\pi$, $K_{\mu3}$, and K_{e3} decay results, unitarity, and *CPT*. Calculates $|(\eta_{000})| = 0.26 \pm 0.20$. We convert to upper limit.

Im(η_{000}) = Im($A(K^0_S \to \pi^0\pi^0\pi^0)/A(K^0_L \to \pi^0\pi^0\pi^0)$)

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

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*
−0.05±0.12±0.05	17300	[33] ANGELOPO...	98B	CPLR

[33] ANGELOPOULOS 98B assumes Re(η_{000}) = Re(ϵ) = 1.635×10^{-3}. Without assuming *CPT* invariance, they obtain Re(η_{000}) = $0.18 \pm 0.14 \pm 0.06$ and Im(η_{000}) = $0.15 \pm 0.20 \pm 0.03$.

K^0_S REFERENCES

ALAVI-HARATI	03	PR D67 012005	A. Alavi-Harati *et al.*	(FNAL KTeV Collab.)
LAI	03	PL B551 7	A. Lai *et al.*	(CERN NA48 Collab.)
ALOISIO	02	PL B535 37	A. Aloisio *et al.*	(KLOE Collab.)
ALOISIO	02B	PL B538 21	A. Aloisio *et al.*	(KLOE Collab.)
LAI	02C	PL B537 28	A. Lai *et al.*	(CERN NA48 Collab.)
LAI	01	PL B514 253	A. Lai *et al.*	(CERN NA48 Collab.)
LAI	00	PL B493 29	A. Lai *et al.*	(CERN NA48 Collab.)
LAI	00B	PL B496 137	A. Lai *et al.*	(CERN NA48 Collab.)
PDG	00	EPJ C15 1	D.E. Groom *et al.*	
ACHASOV	99D	PL B459 674	M.N. Achasov *et al.*	
AKHMETSHIN	99	PL B456 90	R.R. Akhmetshin *et al.*	(Novosibirsk CMD-2 Collab.)
ANGELOPO...	98B	PL B425 391	A. Angelopoulos *et al.*	(CPLEAR Collab.)
ANGELOPO...	98C	EPJ C5 389	A. Angelopoulos *et al.*	(CPLEAR Collab.)
PDG	98	EPJ C3 1	C. Caso *et al.*	
ADLER	97B	PL B407 193	R. Adler *et al.*	(CPLEAR Collab.)
ANGELOPO...	97	PL B413 232	A. Angelopoulos *et al.*	(CPLEAR Collab.)
BERTANZA	97	ZPHY C73 629	L. Bertanza	(PISA, CERN, EDIN, MANZ, ORSAY+)
ADLER	96D	PL B370 167	R. Adler *et al.*	(CPLEAR Collab.)
ADLER	96E	PL B374 313	R. Adler *et al.*	(CPLEAR Collab.)
ZOU	96	PL B369 362	Y. Zou *et al.*	(RUTG, MINN, MICH)
BARR	95B	PL B351 579	G.D. Barr *et al.*	(CERN, EDIN, MANZ, LALO+)
SCHWINGEN...	95	PRL 74 4376	B. Schwingenheuer *et al.*	(EFI, CHIC+)
BLICK	94	PL B334 234	A.M. Blick *et al.*	(SERP, JINR)
THOMSON	94	PL B337 411	G.B. Thomson *et al.*	(RUTG, MINN, MICH)
ZOU	94	PL B329 519	Y. Zou *et al.*	(RUTG, MINN, MICH)
BARR	93B	PL B304 381	G.D. Barr *et al.*	(CERN, EDIN, MANZ, LALO+)

GIBBONS 93 PRL 70 1199 L.K. Gibbons *et al.* (FNAL E731 Collab.)
Also 97 PR D55 6625 L.K. Gibbons *et al.* (FNAL E731 Collab.)
RAMBERG 93 PRL 70 2525 E. Ramberg *et al.* (FNAL E731 Collab.)
BALATS 89 SJNP 49 828 M.Y. Balats *et al.* (ITEP)
Translated from YAF 49 1332.
GIBBONS 88 PRL 61 2661 L.K. Gibbons *et al.* (FNAL E731 Collab.)
BURKHARDT 87 PL B199 139 H. Burkhardt *et al.* (CERN, EDIN, MANZ+)
GROSSMAN 87 PRL 59 18 N. Grossman *et al.* (MINN, MICH, RUTG)
BARMIN 86 SJNP 44 622 V.V. Barmin *et al.* (ITEP)
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