Citation: C. Caso *et al.* (Particle Data Group), European Phys Jour **C3**, 1 (1998) and 1999 partial update for edition 2000 (URL: http://pdg.lbl.gov)

K^0

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

K^0 MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
497.672±0.031 OUR FIT					
497.672±0.031 OUR AVERAGE					
497.661±0.033	3713	BARKOV	87B	CMD	$e^+e^- \to K^0_L K^0_S$
497.742±0.085	780	BARKOV	85B	CMD	$e^+e^- \to K^0_L K^0_S$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
497.44 ±0.50		FITCH	67	OSPK	
498.9 ±0.5	4500	BALTAY	66	HBC	K^0 from $\overline{p}p$
497.44 ±0.33	2223	KIM	65B	HBC	K^0 from $\overline{p}p$
498.1 ±0.4		CHRISTENS...	64	OSPK	

$m_{K^0} - m_{K^\pm}$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
3.995±0.034 OUR FIT Error includes scale factor of 1.1.						
• • • We do not use the following data for averages, fits, limits, etc. • • •						
3.95 ±0.21	417	HILL	68B	DBC	+	$K^+ d \to K^0 pp$
3.90 ±0.25	9	BURNSTEIN	65	HBC	−	
3.71 ±0.35	7	KIM	65B	HBC	−	$K^- p \to n\overline{K}^0$
5.4 ±1.1		CRAWFORD	59	HBC	+	
3.9 ±0.6		ROSENFELD	59	HBC	−	

$|m_{K^0} - m_{\overline{K}^0}| / m_{\text{average}}$

A test of CPT invariance.

VALUE	*DOCUMENT ID*
$<10^{-18}$ OUR EVALUATION	

T-VIOLATION PARAMETER IN K^0-$\overline{K}^0$ MIXING

The asymmetry $A_T = \frac{\Gamma(\overline{K}^0 \to K^0) - \Gamma(K^0 \to \overline{K}^0)}{\Gamma(\overline{K}^0 \to K^0) + \Gamma(K^0 \to \overline{K}^0)}$ must vanish if T invariance holds.

TIME-REVERSAL ASYMMETRY A_T

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*
6.6±1.3±1.0	640k	[1] ANGELOPO...	98E	CPLR

[1] ANGELOPOULOS 98E measures the asymmetry $A_T = [\Gamma(\overline{K}^0_{t=0} \to e^+\pi^-\nu_{t=\tau}) - \Gamma(K^0_{t=0} \to e^-\pi^+\overline{\nu}_{t=\tau})]/[\Gamma(\overline{K}^0_{t=0} \to e^+\pi^-\nu_{t=\tau}) + \Gamma(K^0_{t=0} \to e^-\pi^+\overline{\nu}_{t=\tau})]$ as a function of the neutral-kaon eigentime τ. The initial strangeness of the neutral kaon is tagged by the charge of the accompanying charged kaon in the reactions $p\overline{p} \to K^-\pi^+ K^0$ and $p\overline{p} \to K^+\pi^-\overline{K}^0$. The strangeness at the time of the decay is tagged by the lepton charge. The reported result is the average value of A_T over the interval $1\tau_s < \tau < 20\tau_s$.

CPT-VIOLATION PARAMETERS IN K^0-$\overline{K}^0$ MIXING

If *CP*-violating interactions include a *T* conserving part then

$$|K_S\rangle = [|K_1\rangle + (\epsilon + \Delta)|K_2\rangle]/\sqrt{1+|\epsilon+\Delta|^2}$$
$$|K_L\rangle = [|K_2\rangle + (\epsilon - \Delta)|K_1\rangle]/\sqrt{1+|\epsilon-\Delta|^2}$$

where

$$|K_1\rangle = [|K^0\rangle + |\overline{K}^0\rangle]/\sqrt{2}$$
$$|K_2\rangle = [|K^0\rangle - |\overline{K}^0\rangle]/\sqrt{2}$$

and

$$|\overline{K}^0\rangle = CP|K^0\rangle.$$

The parameter Δ specifies the *CPT*-violating part.

Estimates of Δ are given below assuming the validity of the $\Delta S = \Delta Q$ rule. See also THOMSON 95 for a test of *CPT*-symmetry conservation in K^0 decays using the Bell-Steinberger relation.

REAL PART OF Δ

A nonzero value violates *CPT* invariance.

VALUE (units 10^{-4})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2.9± 2.7 OUR AVERAGE					
2.9± 2.6±0.6	1.3M	[2] ANGELOPO...	98F	CPLR	
180 ±200	6481	[3] DEMIDOV	95		$K_{\ell 3}$ reanalysis

[2] If $\Delta S = \Delta Q$ is not assumed, ANGELOPOULOS 98F finds $\mathrm{Re}\Delta = (3.0 \pm 3.3 \pm 0.6) \times 10^{-4}$.
[3] DEMIDOV 95 reanalyzes data from HART 73 and NIEBERGALL 74.

IMAGINARY PART OF Δ

A nonzero value violates *CPT* invariance.

VALUE (units 10^{-3})	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
− 0.8± 3.1 OUR AVERAGE					
− 0.9± 2.9±1.0	1.3M	[4] ANGELOPO...	98F	CPLR	
21 ±37	6481	[5] DEMIDOV	95		$K_{\ell 3}$ reanalysis

[4] If $\Delta S = \Delta Q$ is not assumed, ANGELOPOULOS 98F finds $\mathrm{Im}\Delta = (-15 \pm 23 \pm 3) \times 10^{-3}$.
[5] DEMIDOV 95 reanalyzes data from HART 73 and NIEBERGALL 74.

K^0 REFERENCES

ANGELOPO...	98E	PL B444 43	A. Angelopoulos+	(CPLEAR Collab.)
ANGELOPO...	98F	PL B444 52	A. Angelopoulos+	(CPLEAR Collab.)
DEMIDOV	95	PAN 58 968	+Gusev, Shabalin	(ITEP)
		From YAF 58 1041.		
THOMSON	95	PR D51 1412	+Zou	(RUTG)
BARKOV	87B	SJNP 46 630	+Vasserman, Vorobev, Ivanov+	(NOVO)
		Translated from YAF 46 1088.		
BARKOV	85B	JETPL 42 138	+Blinov, Vasserman+	(NOVO)
		Translated from ZETFP 42 113.		
NIEBERGALL	74	PL 49B 103	+Regler, Stier+	(CERN, ORSAY, VIEN)
HART	73	NP B66 317	+Hutton, Field, Sharp, Blackmore+	(CAVE, RHEL)
HILL	68B	PR 168 1534	+Robinson, Sakitt, Canter	(BNL, CMU)
FITCH	67	PR 164 1711	+Roth, Russ, Vernon	(PRIN)
BALTAY	66	PR 142 932	+Sandweiss, Stonehill+	(YALE, BNL)
BURNSTEIN	65	PR 138B 895	+Rubin	(UMD)
KIM	65B	PR 140B 1334	+Kirsch, Miller	(COLU)
CHRISTENS...	64	PRL 13 138	Christenson, Cronin, Fitch, Turlay	(PRIN)
CRAWFORD	59	PRL 2 112	+Cresti, Good, Stevenson, Ticho	(LRL)
ROSENFELD	59	PRL 2 110	+Solmitz, Tripp	(LRL)