$\Gamma(\pi^+\mu^-e^+)/\Gamma_{total}$ — Γ_{36}/Γ

Test of lepton family number conservation.

VALUE (units 10^{-9})	CL%	EVTS	DOCUMENT ID		TECN	CHG
< 7	90	0	[56] DIAMANT-...	76	SPEC	+
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<28	90		[56] BEIER	72	OSPK	±

[56] Measurement actually applies to the sum of the $\pi^+\mu^-e^+$ and $\pi^-\mu^+e^+$ modes.

$\Gamma(\pi^-\mu^+e^+)/\Gamma_{total}$ — Γ_{37}/Γ

Test of total lepton number conservation.

VALUE (units 10^{-9})	CL%	EVTS	DOCUMENT ID		TECN	CHG
< 7	90	0	[57] DIAMANT-...	76	SPEC	+
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<28	90		[57] BEIER	72	OSPK	±

[57] Measurement actually applies to the sum of the $\pi^+\mu^-e^+$ and $\pi^-\mu^+e^+$ modes.

$\Gamma(\pi^+\mu^-e^+)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE (units 10^{-8})	CL%	DOCUMENT ID		TECN	CHG
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.4	90	BEIER	72	OSPK	±

$\Gamma(\pi^-e^+e^+)/\Gamma_{total}$ — Γ_{38}/Γ

Test of total lepton number conservation.

VALUE (units 10^{-5})	DOCUMENT ID		TECN	CHG
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<1.5	CHANG	68	HBC	−

$\Gamma(\pi^-e^+e^+)/\Gamma(\pi^+\pi^-e^+\nu_e)$ — Γ_{38}/Γ_9

Test of total lepton number conservation.

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	CHG
<2.5	90	0	[58] DIAMANT-...	76	SPEC	+

[58] DIAMANT-BERGER 76 quotes this result times our 1975 BR ratio.

$\Gamma(\pi^-\mu^+\mu^+)/\Gamma_{total}$ — Γ_{39}/Γ

Forbidden by total lepton number conservation.

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN
<1.5	90	[59] LITTENBERG	92	HBC

[59] LITTENBERG 92 is from retroactive data analysis of CHANG 68 bubble chamber data.

$\Gamma(\mu^+\overline{\nu}_e)/\Gamma_{total}$ — Γ_{40}/Γ

Forbidden by total lepton number conservation.

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<3.3	90	COOPER	82	HLBC	Wideband ν beam

$\Gamma(\pi^0e^+\overline{\nu}_e)/\Gamma_{total}$ — Γ_{41}/Γ

Forbidden by total lepton number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.003	90	COOPER	82	HLBC	Wideband ν beam

$\Gamma(\pi^+\gamma)/\Gamma_{total}$ — Γ_{42}/Γ

Violates angular momentum conservation. Not listed in Summary Table.

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	CHG
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.4	90	ASANO	82	CNTR	+
<4.0	90	[60] KLEMS	71	OSPK	+

[60] Test of model of Selleri, Nuovo Cimento **60A** 291 (1969).

K^+ LONGITUDINAL POLARIZATION OF EMITTED μ^+

$K^+ \rightarrow \mu^+\nu$

Tests for right-handed currents in strangeness-changing decay.

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
> 0.990	90	IMAZATO	92	SPEC	+	KEK 12 GeV protons
• • • We do not use the following data for averages, fits, limits, etc. • • •						
−0.970±0.047		YAMANAKA	86	SPEC	+	
−1.0 ±0.1		CUTTS	69	SPRK	+	
−0.96 ±0.12		COOMBES	57	CNTR	+	

NOTE ON DALITZ PLOT PARAMETERS FOR $K \rightarrow 3\pi$ DECAYS

The Dalitz plot distribution for $K^{\pm} \rightarrow \pi^{\pm}\pi^{\pm}\pi^{\mp}$, $K^{\pm} \rightarrow \pi^0\pi^0\pi^{\pm}$, and $K_L^0 \rightarrow \pi^+\pi^-\pi^0$ can be parameterized by a series expansion such as that introduced by Weinberg [1]. We use the form

$$\left|M\right|^2 \propto 1 + g\frac{(s_3 - s_0)}{am_{\pi^+}^2} + h\left[\frac{s_3 - s_0}{m_{\pi^+}^2}\right]^2 + j\,\frac{(s_2 - s_1)}{m_{\pi^+}^2} + ak\left[\frac{s_2 - s_1}{m_{\pi^+}^2}\right]^2 + \cdots\ , \qquad (1)$$

where $m_{\pi^+}^2$ has been introduced to make the coefficients g, h, j, and k dimensionless, and

$$s_i = (P_K - P_i)^2 = (m_K - m_i)^2 - 2m_K T_i\ ,\ i = 1,2,3,$$

$$s_0 = \frac{1}{3}\sum_i s_i = \frac{1}{3}(m_K^2 + m_1^2 + m_2^2 + m_3^2)$$

Here the P_i are four-vectors, m_i and T_i are the mass and kinetic energy of the i^{th} pion, and the index 3 is used for the odd pion.

The coefficient g is a measure of the slope in the variable s_3 (or T_3) of the Dalitz plot, while h and k measure the quadratic dependence on s_3 and $(s_2 - s_1)$, respectively. The coefficient j is related to the asymmetry of the plot and must be zero if CP invariance holds. Note also that if CP is good, g, h, and k must be the same for $K^+ \rightarrow \pi^+\pi^+\pi^-$ as for $K^- \rightarrow \pi^-\pi^-\pi^+$.

Since different experiments use different forms for $\left|M\right|^2$, in order to compare the experiments we have converted to g, h, j, and k whatever coefficients have been measured. Where such conversions have been done, the measured coefficient a_y, a_t, a_u, or a_v is given in the comment at the right. For definitions of these coefficients, details of this conversion, and discussion of the data, see the April 1982 version of this note [2].

References

1. S. Weinberg, Phys. Rev. Lett. **4**, 87 (1960).
2. Particle Data Group, Phys. Lett. **111B**, 69 (1982).

ENERGY DEPENDENCE OF $K^{\pm}$ DALITZ PLOT

$|\text{matrix element}|^2 = 1 + gu + hu^2 + kv^2$

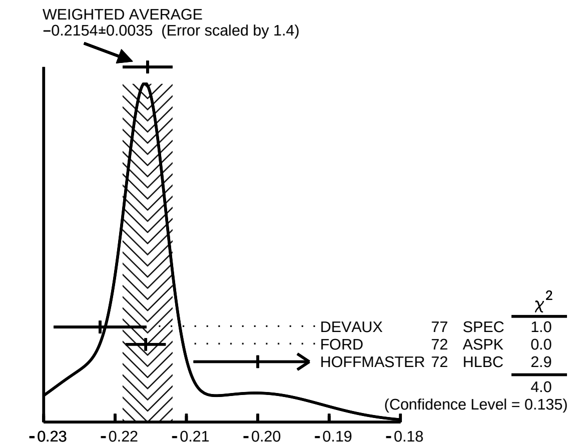
where $u = (s_3 - s_0)\ /\ m_\pi^2$ and $v = (s_1 - s_2)\ /\ m_\pi^2$

LINEAR COEFFICIENT g_{τ^+} FOR $K^+ \rightarrow \pi^+\pi^+\pi^-$

Some experiments use Dalitz variables x and y. In the comments we give a_y = coefficient of y term. See note above on "Dalitz Plot Parameters for $K \rightarrow 3\pi$ Decays." For discussion of the conversion of a_y to g, see the earlier version of the same note in the *Review* published in Physics Letters **111B** 70 (1982).

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
−0.2154±0.0035 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.					
−0.2221±0.0065	225k	DEVAUX	77	SPEC	+	a_y=.2814 ± .0082
−0.2157±0.0028	750k	FORD	72	ASPK	+	a_y=.2734 ± .0035
−0.200 ±0.009	39819	[61] HOFFMASTER	72	HLBC	+	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
−0.196 ±0.012	17898	[62] GRAUMAN	70	HLBC	+	a_y=0.228 ± 0.030
−0.218 ±0.016	9994	[63] BUTLER	68	HBC	+	a_y=0.277 ± 0.020
−0.22 ±0.024	5428	[63,64] ZINCHENKO	67	HBC	+	a_y=0.28 ± 0.03

[61] HOFFMASTER 72 includes GRAUMAN 70 data.
[62] Emulsion data added — all events included by HOFFMASTER 72.
[63] Experiments with large errors not included in average.
[64] Also includes DBC events.



Linear energy dependence for $K^+ \rightarrow \pi^+\pi^+\pi^-$