$\Gamma(\pi^+\pi^0\gamma)/\Gamma_{\text{total}}$ Γ_{20}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
2.75±0.15 OUR AVERAGE							
2.71±0.45		140	BOLOTOV	87	WIRE	–	$T\pi^-$ 55–90 MeV
2.87±0.32		2461	SMITH	76	WIRE	±	$T\pi^{\pm}$ 55–90 MeV
2.71±0.19		2100	ABRAMS	72	ASPK	±	$T\pi^+$ 55–90 MeV
• • • We do not use the following data for averages, fits, limits, etc. • • •							
$1.5\ ^{+1.1}_{-0.6}$			[43] LJUNG	73	HLBC	+	$T\pi^+$ 55–80 MeV
$2.6\ ^{+1.5}_{-1.1}$			[43] LJUNG	73	HLBC	+	$T\pi^+$ 55–90 MeV
$6.8\ ^{+3.7}_{-2.1}$		17	[43] LJUNG	73	HLBC	+	$T\pi^+$ 55–102 MeV
2.4 ±0.8		24	EDWARDS	72	OSPK		$T\pi^+$ 58–90 MeV
<1.0		0	[44] MALTSEV	70	HLBC	+	$T\pi^+$ <55 MeV
<1.9	90	0	EMMERSON	69	OSPK		$T\pi^+$ 55–80 MeV
2.2 ±0.7		18	CLINE	64	FBC	+	$T\pi^+$ 55–80 MeV

[43] The LJUNG 73 values are not independent.
[44] MALTSEV 70 selects low π^+ energy to enhance direct emission contribution.

$\Gamma(\pi^+\pi^0\gamma(\text{DE}))/\Gamma_{\text{total}}$ Γ_{21}/Γ

Direct emission part of $\Gamma(\pi^+\pi^0\gamma)/\Gamma_{\text{total}}$.

VALUE (units 10^{-5})	DOCUMENT ID		TECN	CHG	COMMENT
1.8 ±0.4 OUR AVERAGE					
$2.05\pm0.46\ ^{+0.39}_{-0.23}$	BOLOTOV	87	WIRE	–	$T\pi^-$ 55–90 MeV
2.3 ±3.2	SMITH	76	WIRE	±	$T\pi^{\pm}$ 55–90 MeV
1.56±0.35±0.5	ABRAMS	72	ASPK	±	$T\pi^{\pm}$ 55–90 MeV

$\Gamma(\pi^+\pi^+\pi^-\gamma)/\Gamma_{\text{total}}$ Γ_{22}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1.04±0.31 OUR AVERAGE						
1.10±0.48	7	BARMIN	89	XEBC		$E(\gamma) > 5$ MeV
1.0 ±0.4		STAMER	65	EMUL	+	$E(\gamma)$ >11 MeV

$\Gamma(\pi^+\pi^0\pi^0\gamma)/\Gamma(\pi^+\pi^0\pi^0)$ Γ_{23}/Γ_5

VALUE (units 10^{-4})	DOCUMENT ID		TECN	CHG	COMMENT
$\mathbf{4.3\ ^{+3.2}_{-1.7}}$	BOLOTOV	85	SPEC	–	$E(\gamma) > 10$ MeV

$\Gamma(\pi^0\mu^+\nu_\mu\gamma)/\Gamma_{\text{total}}$ Γ_{24}/Γ

VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
<6.1	90	0	LJUNG	73	HLBC	+	$E(\gamma)$ >30 MeV

$\Gamma(\pi^0 e^+\nu_e\gamma)/\Gamma(\pi^0 e^+\nu_e)$ Γ_{25}/Γ_7

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
0.54±0.04 OUR AVERAGE Error includes scale factor of 1.1.						
0.46±0.08	82	[45] BARMIN	91	XEBC		$E(\gamma) > 10$ MeV, $0.6 < \cos\theta_{e\gamma} < 0.9$
0.56±0.04	192	[46] BOLOTOV	86B	CALO	–	$E(\gamma)$ >10 MeV
0.76±0.28	13	[47] ROMANO	71	HLBC		$E(\gamma)$ >10 MeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1.51±0.25	82	[45] BARMIN	91	XEBC		$E(\gamma) > 10$ MeV, $\cos\theta_{e\gamma} < 0.98$
0.48±0.20	16	[48] LJUNG	73	HLBC	+	$E(\gamma)$ >30 MeV
$0.22\ ^{+0.15}_{-0.10}$		[48] LJUNG	73	HLBC	+	$E(\gamma)$ >30 MeV
0.53±0.22		[47] ROMANO	71	HLBC	+	$E(\gamma)$ >30 MeV
1.2 ±0.8		BELLOTTI	67	HLBC	+	$E(\gamma)$ >30 MeV

[45] BARMIN 91 quotes branching ratio $\Gamma(K \to e\pi^0\nu\gamma)/\Gamma_{\text{all}}$. The measured normalization is $[\Gamma(K \to e\pi^0\nu) + \Gamma(K \to \pi^+\pi^+\pi^-)]$. For comparison with other experiments we used $\Gamma(K \to e\pi^0\nu)/\Gamma_{\text{all}} = 0.0482$ to calculate the values quoted here.
[46] $\cos\theta(e\gamma)$ between 0.6 and 0.9.
[47] Both ROMANO 71 values are for $\cos\theta(e\gamma)$ between 0.6 and 0.9. Second value is for comparison with second LJUNG 73 value. We use lowest $E(\gamma)$ cut for Summary Table value. See ROMANO 71 for E_γ dependence.
[48] First LJUNG 73 value is for $\cos\theta(e\gamma) < 0.9$, second value is for $\cos\theta(e\gamma)$ between 0.6 and 0.9 for comparison with ROMANO 71.

$\Gamma(\pi^0 e^+\nu_e\gamma(\text{SD}))/\Gamma_{\text{total}}$ Γ_{26}/Γ

Structure-dependent part.

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	CHG
<5.3	90	BOLOTOV	86B	CALO	–

$\Gamma(\pi^0\pi^0 e^+\nu_e\gamma)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
<5	90	0	BARMIN	92	XEBC	+	$E_\gamma > 10$ MeV

$\Gamma(\pi^+\pi^+ e^-\overline{\nu}_e)/\Gamma_{\text{total}}$ Γ_{28}/Γ

Test of $\Delta S = \Delta Q$ rule.

VALUE (units 10^{-7})	CL%	EVTS	DOCUMENT ID		TECN	CHG
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 9.0	95	0	SCHWEINB...	71	HLBC	+
< 6.9	95	0	ELY	69	HLBC	+
<20.	95		BIRGE	65	FBC	+

$\Gamma(\pi^+\pi^+ e^-\overline{\nu}_e)/\Gamma(\pi^+\pi^- e^+\nu_e)$ Γ_{28}/Γ_9

Test of $\Delta S = \Delta Q$ rule.

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID		TECN
< 3	90	3	[49] BLOCH	76	SPEC
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<130.	95	0	BOURQUIN	71	ASPK

[49] BLOCH 76 quotes 3.6×10^{-4} at CL = 95%, we convert.

$\Gamma(\pi^+\pi^+\mu^-\overline{\nu}_\mu)/\Gamma_{\text{total}}$ Γ_{29}/Γ

Test of $\Delta S = \Delta Q$ rule.

VALUE (units 10^{-6})	CL%	EVTS	DOCUMENT ID		TECN	CHG
<3.0	95	0	BIRGE	65	FBC	+

$\Gamma(\pi^+ e^+ e^-)/\Gamma_{\text{total}}$ Γ_{30}/Γ

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

VALUE (units 10^{-7})	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
2.74±0.23 OUR AVERAGE							
2.75±0.23±0.13		500	[50] ALLIEGRO	92	SPEC	+	
2.7 ±0.5		41	[51] BLOCH	75	SPEC	+	
• • • We do not use the following data for averages, fits, limits, etc. • • •							
< 17	90		CENCE	74	ASPK	+	Three track evts
< 2.7	90		CENCE	74	ASPK	+	Two track events
<320	90		BEIER	72	OSPK	±	
< 44	90		BISI	67	DBC	+	
< 8.8	90		CLINE	67B	FBC	+	
< 24.5	90	1	CAMERINI	64	FBC	+	

[50] ALLIEGRO 92 assumes a vector interaction with a form factor given by $\lambda = 0.105 \pm 0.035 \pm 0.015$ and a correlation coefficient of -0.82.
[51] BLOCH 75 assumes a vector interaction.

$\Gamma(\pi^+\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_{31}/Γ

Test for $\Delta S = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	CHG
< 2.3	90	ATIYA	89	CNTR	+
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<24	90	BISI	67	DBC	+
<30	90	CAMERINI	65	FBC	+

$\Gamma(\pi^+\nu\overline{\nu})/\Gamma_{\text{total}}$ Γ_{32}/Γ

Test for $\Delta S = 1$ weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-9})	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
< 5.2	90		[52] ATIYA	93	CNTR	+	
• • • We do not use the following data for averages, fits, limits, etc. • • •							
< 7.5	90		ATIYA	93	CNTR	+	$T(\pi)$ 115–127 MeV
< 17	90	0	ATIYA	93B	CNTR	+	$T(\pi)$ 60–100 MeV
< 34	90		ATIYA	90	CNTR	+	
< 140	90		ASANO	81B	CNTR	+	$T(\pi)$ 116–127 MeV
< 940	90		[53] CABLE	73	CNTR	+	$T(\pi)$ 60–105 MeV
< 560	90		[53] CABLE	73	CNTR	+	$T(\pi)$ 60–127 MeV
<57000	90	0	[54] LJUNG	73	HLBC	+	
< 1400	90		[53] KLEMS	71	OSPK	+	$T(\pi)$ 117–127 MeV

[52] Combining ATIYA 93 and ATIYA 93B results.
[53] KLEMS 71 and CABLE 73 assume π spectrum same as K_{e3} decay. Second CABLE 73 limit combines CABLE 73 and KLEMS 71 data for vector interaction.
[54] LJUNG 73 assumes vector interaction.

$\Gamma(\mu^-\nu e^+ e^+)/\Gamma(\pi^+\pi^- e^+\nu_e)$ Γ_{33}/Γ_9

Test of lepton family number conservation.

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	CHG
<0.5	90	0	[55] DIAMANT-...	76	SPEC	+

[55] DIAMANT-BERGER 76 quotes this result times our 1975 $\pi^+\pi^- e\nu$ BR ratio.

$\Gamma(\mu^+\nu_e)/\Gamma_{\text{total}}$ Γ_{34}/Γ

Forbidden by lepton family number conservation.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
<0.004	90	0	LYONS	81	HLBC	0	200 GeV K^+ narrow band ν beam
• • • We do not use the following data for averages, fits, limits, etc. • • •							
<0.012	90		COOPER	82	HLBC		Wideband ν beam

$\Gamma(\pi^+\mu^+ e^-)/\Gamma_{\text{total}}$ Γ_{35}/Γ

Test of lepton family number conservation.

VALUE (units 10^{-10})	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
< 2.1	90	0	LEE	90	SPEC	+	
• • • We do not use the following data for averages, fits, limits, etc. • • •							
<11	90	0	CAMPAGNARI	88	SPEC	+	In LEE 90
<48	90	0	DIAMANT-...	76	SPEC	+	