The electroweak decays of the pseudoscalar mesons are investigated to learn something about the unknown hadronic structure of these mesons, assuming a standard $V-A$ structure of the weak leptonic current. The experiments are quite difficult, and it is not meaningful to analyse the results using parameters for both the hadronic structure (decay constants, form factors) and the leptonic weak current (*e.g.*, to add pseudoscalar or tensor couplings to the $V-A$ coupling). Deviations from the $V-A$ interactions are much better studied in purely leptonic systems such as muon decay.

References

1. D.A. Bryman *et al.*, Phys. Reports **88**, 151 (1982). See also our "Note on Pseudoscalar-Meson Decay Constants," above.
2. A. Kersch and F. Scheck, Nucl. Phys. **B263**, 475 (1986).
3. W.T. Chu *et al.*, Phys. Rev. **166**, 1577 (1968).
4. D.Yu. Bardin and E.A. Ivanov, Sov. J. Nucl. Phys. **7**, 286 (1976).
5. S.G. Brown and S.A. Bludman, Phys. Rev. **136**, B1160 (1964).

$\pi^{\pm}$ FORM FACTORS

F_V, VECTOR FORM FACTOR

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.017±0.008 OUR AVERAGE					
0.014±0.009		[17] BOLOTOV	90B	SPEC	17 GeV $\pi^- \rightarrow e^- \overline{\nu}_e \gamma$
$0.023^{+0.015}_{-0.013}$	98	EGLI	89	SPEC	$\pi^+ \rightarrow e^+ \nu_e e^+ e^-$

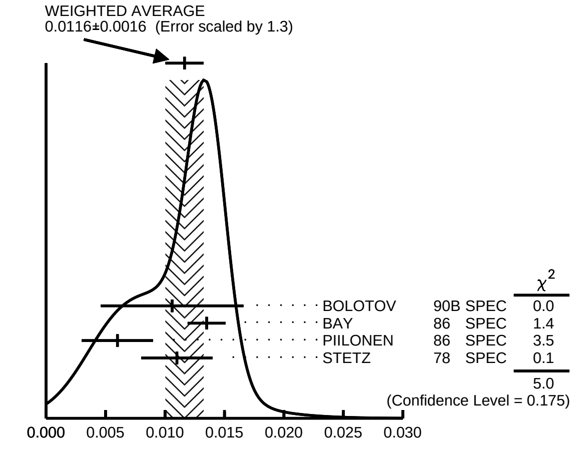
[17] BOLOTOV 90B only determines the absolute value.

F_A, AXIAL-VECTOR FORM FACTOR

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.0116±0.0016 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.				
0.0106±0.0060		[18] BOLOTOV	90B	SPEC	17 GeV $\pi^- \rightarrow e^- \overline{\nu}_e \gamma$
0.0135±0.0016		[18] BAY	86	SPEC	$\pi^+ \rightarrow e^+ \nu \gamma$
0.006 ±0.003		[18] PIILONEN	86	SPEC	$\pi^+ \rightarrow e^+ \nu \gamma$
0.011 ±0.003		[18,19] STETZ	78	SPEC	$\pi^+ \rightarrow e^+ \nu \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.021\ ^{+0.011}_{-0.013}$	98	EGLI	89	SPEC	$\pi^+ \rightarrow e^+ \nu_e e^+ e^-$

[18] Using the vector form factor from CVC prediction $F_V = 0.0259 \pm 0.0005$. Only the absolute value of F_A is determined.

[19] The result of STETZ 78 has a two-fold ambiguity. We take the solution compatible with later determinations.



$\pi^{\pm}$ axial-vector form factor

R, SECOND AXIAL-VECTOR FORM FACTOR

VALUE	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{0.059^{+0.009}_{-0.008}}$	98	EGLI	89	SPEC	$\pi^+ \rightarrow e^+ \nu_e e^+ e^-$

$\pi^{\pm}$ REFERENCES

We have omitted some papers that have been superseded by later experiments. The omitted papers may be found in our 1988 edition Physics Letters **B204** (1988).

JECKELMANN	94	PL B (accepted)	+Goudsmit, Leisi	(WABRN, VILL)
CZAPEK	93	PRL 70 17	+Federspiel, Flueckiger, Frei+	(BERN, VILL)
BARANOV	92	SJNP 55 1644	+Vanko, Glazov, Evtukhovich+	(JINR)
		Translated from YAF 55 2940.		
BRITTON	92	PRL 68 3000	+Ahmad, Bryman, Burnham+	(TRIU, CARL)
Also	94	PR D49 28	Britton, Ahmad, Bryman+	(TRIU, CARL)
NUMAO	92	MPL A7 3357		(TRIU)
BARANOV	91B	SJNP 54 790	+Kisel, Korenchenko, Kuchinskii+	(JINR)
		Translated from YAF 54 1298.		
DAUM	91	PL B265 425	+Frosch, Herter, Janousch, Kettle	(VILL)
BOLOTOV	90B	PL B243 308	+Gninenko, Djilkibaev, Isakov+	(INRM)
EGLI	89	PL B222 533	+Engfer, Grab, Hermes, Kraus+	(SINDRUM Collab.)
Also	86	PL B175 97	Egli, Engfer, Grab, Hermes+	(AACH3, ETH, SIN, ZURI)
PDG	88	PL B204	Yost, Barnett+	(LBL+)
PICCIOTTO	88	PR D37 1131	+Ahmad, Britton, Bryman, Clifford+	(TRIU, CNRC)
COHEN	87	RMP 59 1121	+Taylor	(RISC, NBS)
KORENCHE...	87	SJNP 46 192	Korenchenko, Kostin, Mzhaviya+	(JINR)
		Translated from YAF 46 313.		
BAY	86	PL B174 445	+Ruegger, Gabioud, Joseph, Loude+	(LAUS, ZURI)
BRYMAN	86	PR D33 1211	+Dubois, Macdonald, Numao+	(TRIU, CNRC)
Also	83	PRL 50 7	Bryman, Dubois, Numao, Olaniya+	(TRIU, CNRC)
JECKELMANN	86B	NP A457 709	+Beer, Chambrier, Elsenhans+	(ETH, FRIB)
Also	86	PRL 56 1444	Jeckelmann, Nakada, Beer+	(ETH, FRIB)
PIILONEN	86	PRL 57 1402	+Bolton, Cooper, Frank+	(LANL, TEMP, CHIC)
MCFARLANE	85	PR D32 547	+Auerbach, Gaille+	(TEMP, LANL)
ABELA	84	PL 146B 431	+Daum, Eaton, Frosch, Jost, Kettle+	(SIN)
Also	78	PL 74B 126	Daum, Eaton, Frosch, Hirschmann+	(SIN)
Also	79	PR D20 2692	Daum, Eaton, Frosch, Hirschmann+	(SIN)
FETSCHER	84	PL 140B 117		(ETH)
ABELA	83	NP A395 413	+Backenstoss, Kunold, Simons+	(BASL, KARLK, KARLE)
CARR	83	PRL 51 627	+Gidal, Gobbi, Jodidio, Oram+	(LBL, NWES, TRIU)
COOPER	82	PL 112B 97	+Guy, Michette, Tyndel, Venus	(RL)
LU	80	PRL 45 1066	+Delker, Dugan, Wu, Caffrey+	(YALE, COLU, JHU)
STETZ	78	NP B138 285	+Carroll, Ortendahl, Perez-Mendez+	(LBL, UCLA)
CARTER	76	PRL 37 1380	+Dixit, Sundaresan+	(CARL, CNRC, CHIC, CIT)
KORENCHE...	76B	JETP 44 35	Korenchenko, Kostin, Micelmacher+	(JINR)
		Translated from ZETF 71 69.		
MARUSHEN...	76	JETPL 23 72	Marushenko, Mezentsev, Petrunin+	(PNPI)
		Translated from ZETFP 23 80.		
Also	76	Private Comm.	Shafer	(FNAL)
Also	78	Private Comm.	Smirnov	(PNPI)
DUNAITSEV	73	SJNP 16 292	+Prokoshkin, Razuvaev+	(SERP)
		Translated from YAF 16 524.		
AYRES	71	PR D3 1051	+Cormack, Greenberg, Kenney+	(LRL, UCSB)
Also	67	PR 157 1288	Ayres, Caldwell, Greenberg, Kenney, Kurz+	(LRL)
Also	68	PRL 21 261	Ayres, Cormack, Greenberg+	(LRL, UCSB)
Also	69	UCRL 18369 Thesis	Ayres	(LRL)
Also	69	PRL 23 1267	Greenberg, Ayres, Cormack+	(LRL, UCSB)
KORENCHE...	71	SJNP 13 189	Korenchenko, Kostin, Micelmacher+	(JINR)
		Translated from YAF 13 339.		
BOOTH	70	PL 32B 723	+Johnson, Williams, Wormald	(LIVP)
DEPOMMIER	68	NP B4 189	+Duclos, Heintze, Kleinknecht+	(CERN)
PETRUKHIN	68	JINR P1 3862	+Rykalin, Khazins, Cisek	(JINR)
HYMAN	67	PL 25B 376	+Loken, Pewitt, McKenzie+	(ANL, CMU, NWES)
NORDBERG	67	PL 24B 594	+Lobkowicz, Burman	(ROCH)
BARDON	66	PRL 16 775	+Dore, Dorfan, Krieger+	(COLU)
KINSEY	66	PR 144 1132	+Lobkowicz, Nordberg	(ROCH)
LOBKOWICZ	66	PRL 17 548	+Melissinos, Nagashima+	(ROCH, BNL)
BACASTOW	65	PR 139B 407	+Ghesquiere, Wiegand, Larsen	(LRL, SLAC)
BERTRAM	65	PR 139B 617	+Meyer, Carrigan+	(MICH, CMU)
DUNAITSEV	65	JETP 20 58	+Petrukhin, Prokoshkin+	(JINR)
		Translated from ZETF 47 84.		
ECKHAUSE	65	PL 19 348	+Harris, Shuler+	(WILL)
BARTLETT	64	PR 136B 1452	+Devons, Meyer, Rosen	(COLU)
DICAPUA	64	PR 133B 1333	+Garland, Pondrom, Strelzoff	(COLU)
Also	86	Private Comm.	Pondrom	(WISC)
DEPOMMIER	63	PL 5 61	+Heintze, Rubbia, Soergel	(CERN)
DEPOMMIER	63B	PL 7 285	+Heintze, Rubbia, Soergel	(CERN)
ANDERSON	60	PR 119 2050	+Fujii, Miller+	(EFI)
CASTAGNOLI	58	PR 112 1779	+Muchnik	(ROMA)

$\boxed{\pi^0}$

$$I^G(J^{PC}) = 1^-(0^{-+})$$

We have omitted some results that have been superseded by later experiments. The omitted results may be found in our 1988 edition Physics Letters **B204** (1988).

π^0 MASS

The value is calculated from $m_{\pi^\pm}$ and $(m_{\pi^\pm} - m_{\pi^0})$. The value of $m_{\pi^\pm}$ has gone up by three (old) standard deviations since our 1992 edition, and thus m_{π^0} has also jumped. See the "Note on the Charged Pion Mass" in the $\pi^{\pm}$ Listings.

VALUE (MeV)	*DOCUMENT ID*
134.9764±0.0006 OUR FIT	

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

Measurements with an error > 0.01 MeV have been omitted from this Listing.

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
4.5936 ±0.0005 OUR FIT				
4.5936 ±0.0005 OUR AVERAGE				
4.59364±0.00048	CRAWFORD	91	CNTR	$\pi^- p \rightarrow \pi^0 n$, n TOF
4.5930 ±0.0013	CRAWFORD	86	CNTR	$\pi^- p \rightarrow \pi^0 n$, n TOF
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4.59366±0.00048	CRAWFORD	88B	CNTR	See CRAWFORD 91
4.6034 ±0.0052	VASILEVSKY	66	CNTR	
4.6056 ±0.0055	CZIRR	63	CNTR	