CITATION: R.M. Barnett et al. Physical Review D54, 1 (1996) and 1997 off-year partial update for the 1998 edition (URL: http://pdg.lbl.gov)

$K^*(892)$

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

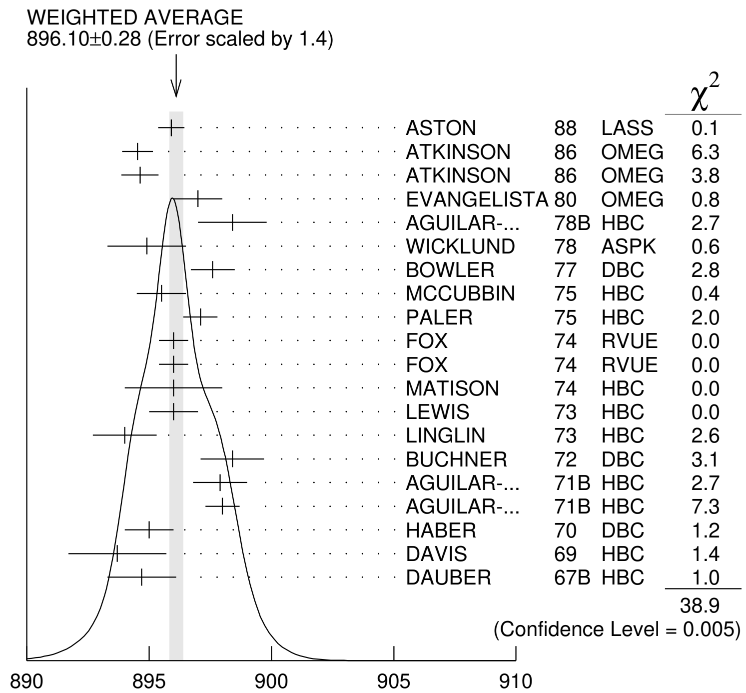
$K^*(892)$ MASS

CHARGED ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
891.59±0.24 OUR AVERAGE		Error includes scale factor of 1.1.				
890.4 ±0.2 ±0.5	79709±801	[1] BIRD	89	LASS	−	11 $K^- p \to \overline{K}^0 \pi^- p$
892.6 ±0.5	5840	BAUBILLIER	84B	HBC	−	8.25 $K^- p \to \overline{K}^0 \pi^- p$
888 ±3		NAPIER	84	SPEC	+	200 $\pi^- p \to 2K^0_S X$
891 ±1		NAPIER	84	SPEC	−	200 $\pi^- p \to 2K^0_S X$
891.7 ±2.1	3700	BARTH	83	HBC	+	70 $K^+ p \to K^0 \pi^+ X$
891 ±1	4100	TOAFF	81	HBC	−	6.5 $K^- p \to \overline{K}^0 \pi^- p$
892.8 ±1.6		AJINENKO	80	HBC	+	32 $K^+ p \to K^0 \pi^+ X$
890.7 ±0.9	1800	AGUILAR-...	78B	HBC	±	0.76 $\overline{p} p \to K^\mp K^0_S \pi^\pm$
886.6 ±2.4	1225	BALAND	78	HBC	±	12 $\overline{p} p \to (K\pi)^\pm X$
891.7 ±0.6	6706	COOPER	78	HBC	±	0.76 $\overline{p} p \to (K\pi)^\pm X$
891.9 ±0.7	9000	[2] PALER	75	HBC	−	14.3 $K^- p \to (K\pi)^- X$
892.2 ±1.5	4404	AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p \to (K\pi)^- p$
891 ±2	1000	CRENNELL	69D	DBC	−	3.9 $K^- N \to K^0 \pi^- X$
894 ±1.0	2886	[3] FRIEDMAN	69	HBC	−	2.1 $K^- p \to \overline{K}^0 \pi^- p$
892 ±2	728	FRIEDMAN	69	HBC	−	2.45 $K^- p \to \overline{K}^0 \pi^- p$
892 ±1.0	3229	FRIEDMAN	69	HBC	−	2.6 $K^- p \to \overline{K}^0 \pi^- p$
892 ±1.6	1027	FRIEDMAN	69	HBC	−	2.7 $K^- p \to \overline{K}^0 \pi^- p$
890 ±3.0	720	BARLOW	67	HBC	±	1.2 $\overline{p} p \to (K^0 \pi)^\pm K^\mp$
889 ±3.0	600	BARLOW	67	HBC	±	1.2 $\overline{p} p \to (K^0 \pi)^\pm K \pi$
891 ±2.3	620	[3] DEBAERE	67B	HBC	+	3.5 $K^+ p \to K^0 \pi^+ p$
891.0 ±1.2	1700	[4] WOJCICKI	64	HBC	−	1.7 $K^- p \to \overline{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
890.0 ±2.3	800	[3,4] CLELAND	82	SPEC	+	30 $K^+ p \to K^0_S \pi^+ p$
896.0 ±1.1	3200	[3,4] CLELAND	82	SPEC	+	50 $K^+ p \to K^0_S \pi^+ p$
893 ±1	3600	[3,4] CLELAND	82	SPEC	−	50 $K^+ p \to K^0_S \pi^- p$
896.0 ±1.9	380	DELFOSSE	81	SPEC	+	50 $K^\pm p \to K^\pm \pi^0 p$
886.0 ±2.3	187	DELFOSSE	81	SPEC	−	50 $K^\pm p \to K^\pm \pi^0 p$
894.2 ±2.0	765	[3] CLARK	73	HBC	−	3.13 $K^- p \to \overline{K}^0 \pi^- p$
894.3 ±1.5	1150	[3,4] CLARK	73	HBC	−	3.3 $K^- p \to \overline{K}^0 \pi^- p$
888 ±2.5	540	[3] DEWIT	68	HBC	−	3 $K^- n \to \overline{K}^0 \pi^- n$
892.0 ±2.6	341	[3] SCHWEING...	68	HBC	−	5.5 $K^- p \to \overline{K}^0 \pi^- p$

NEUTRAL ONLY

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
896.10±0.28 OUR AVERAGE		Error includes scale factor of 1.4. See the ideogram below.				
895.9 ±0.5 ±0.2		ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
894.52±0.63	25k	[2] ATKINSON	86	OMEG		20–70 γp
894.63±0.76	20k	[2] ATKINSON	86	OMEG		20–70 γp
897 ±1	28k	EVANGELISTA	80	OMEG	0	10 $\pi^- p \to K^+ \pi^- (\Lambda,\Sigma)$
898.4 ±1.4	1180	AGUILAR-...	78B	HBC	0	0.76 $\overline{p} p \to K^\mp K^0_S \pi^\pm$
894.9 ±1.6		WICKLUND	78	ASPK	0	3,4,6 $K^\pm N \to (K\pi)^0 N$
897.6 ±0.9		BOWLER	77	DBC	0	5.4 $K^+ d \to K^+ \pi^- p p$
895.5 ±1.0	3600	MCCUBBIN	75	HBC	0	3.6 $K^- p \to K^- \pi^+ n$
897.1 ±0.7	22k	[2] PALER	75	HBC	0	14.3 $K^- p \to (K\pi)^0 X$
896.0 ±0.6	10k	FOX	74	RVUE	0	2 $K^- p \to K^- \pi^+ n$
896.0 ±0.6		FOX	74	RVUE	0	2 $K^+ n \to K^+ \pi^- p$
896 ±2		[5] MATISON	74	HBC	0	12 $K^+ p \to K^+ \pi^- \Delta$
896 ±1	3186	LEWIS	73	HBC	0	2.1–2.7 $K^+ p \to K \pi \pi p$
894.0 ±1.3		[5] LINGLIN	73	HBC	0	2–13 $K^+ p \to K^+ \pi^- \pi^+ p$
898.4 ±1.3	1700	[3] BUCHNER	72	DBC	0	4.6 $K^+ n \to K^+ \pi^- p$
897.9 ±1.1	2934	[3] AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \to K^- \pi^+ n$
898.0 ±0.7	5362	[3] AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \to K^- \pi^+ \pi^- p$
895 ±1	4300	[4] HABER	70	DBC	0	3 $K^- N \to K^- \pi^+ X$
893.7 ±2.0	10k	DAVIS	69	HBC	0	12 $K^+ p \to K^+ \pi^- \pi^+ p$
894.7 ±1.4	1040	[3] DAUBER	67B	HBC	0	2.0 $K^- p \to K^- \pi^+ \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
900.7 ±1.1	5900	BARTH	83	HBC	0	70 $K^+ p \to K^+ \pi^- X$



$K^*(892)^0$ mass (MeV)

[1] From a partial wave amplitude analysis.

[2] Inclusive reaction. Complicated background and phase-space effects.

[3] Mass errors enlarged by us to $\Gamma/\sqrt{N}$. See note.

[4] Number of events in peak reevaluated by us.

[5] From pole extrapolation.

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$m_{K^*(892)^0} - m_{K^*(892)^\pm}$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
6.7±1.2 OUR AVERAGE						
7.7±1.7	2980	AGUILAR-...	78B	HBC	±0	0.76 $\overline{p}p \rightarrow K^\mp K^0_S \pi^\pm$
5.7±1.7	7338	AGUILAR-...	71B	HBC	−0	3.9,4.6 $K^- p$
6.3±4.1	283	[6] BARASH	67B	HBC		0.0 $\overline{p}p$

[6] Number of events in peak reevaluated by us.

$K^*(892)$ RANGE PARAMETER

All from partial wave amplitude analyses.

VALUE (GeV^{-1})	DOCUMENT ID		TECN	CHG	COMMENT
$12.1 \pm 3.2 \pm 3.0$	BIRD	89	LASS	−	$11\ K^- p \to \overline{K}^0 \pi^- p$
3.4 ± 0.7	ASTON	88	LASS	0	$11\ K^- p \to K^- \pi^+ n$

$K^*(892)$ WIDTH

CHARGED ONLY

VALUE (MeV)	EVTS		DOCUMENT ID		TECN	CHG	COMMENT
49.8±0.8 OUR FIT							
49.8±0.8 OUR AVERAGE							
$45.2 \pm 1 \quad \pm 2$	79709 ± 801	[7]	BIRD	89	LASS	−	$11\ K^- p \to \overline{K}^0 \pi^- p$
$49 \quad \pm 2$	5840		BAUBILLIER	84B	HBC	−	$8.25\ K^- p \to \overline{K}^0 \pi^- p$
$56 \quad \pm 4$			NAPIER	84	SPEC	−	$200\ \pi^- p \to 2K^0_S X$
$51 \quad \pm 2$	4100		TOAFF	81	HBC	−	$6.5\ K^- p \to \overline{K}^0 \pi^- p$
50.5 ± 5.6			AJINENKO	80	HBC	+	$32\ K^+ p \to K^0 \pi^+ X$
45.8 ± 3.6	1800		AGUILAR-...	78B	HBC	±	$0.76\ \overline{p} p \to K^\mp K^0_S \pi^\pm$
52.0 ± 2.5	6706	[8]	COOPER	78	HBC	±	$0.76\ \overline{p} p \to (K\pi)^\pm X$
52.1 ± 2.2	9000	[9]	PALER	75	HBC	−	$14.3\ K^- p \to (K\pi)^- X$
46.3 ± 6.7	765	[8]	CLARK	73	HBC	−	$3.13\ K^- p \to \overline{K}^0 \pi^- p$
48.2 ± 5.7	1150	[8,10]	CLARK	73	HBC	−	$3.3\ K^- p \to \overline{K}^0 \pi^- p$
54.3 ± 3.3	4404	[8]	AGUILAR-...	71B	HBC	−	$3.9,4.6\ K^- p \to (K\pi)^- p$
$53 \quad \pm 4.0$	2886	[8]	FRIEDMAN	69	HBC	−	$2.1\ K^- p \to \overline{K}^0 \pi^- p$
$49 \quad \pm 7.3$	728	[8]	FRIEDMAN	69	HBC	−	$2.45\ K^- p \to \overline{K}^0 \pi^- p$
$46 \quad \pm 3.2$	3229	[8]	FRIEDMAN	69	HBC	−	$2.6\ K^- p \to \overline{K}^0 \pi^- p$
$49 \quad \pm 6.1$	1027	[8]	FRIEDMAN	69	HBC	−	$2.7\ K^- p \to \overline{K}^0 \pi^- p$
$46 \quad \pm 5$	1700	[8,10]	WOJCICKI	64	HBC	−	$1.7\ K^- p \to \overline{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
42.8 ± 7.1	3700		BARTH	83	HBC	+	$70\ K^+ p \to K^0 \pi^+ X$
64.0 ± 9.2	800	[8,10]	CLELAND	82	SPEC	+	$30\ K^+ p \to K^0_S \pi^+ p$
62.0 ± 4.4	3200	[8,10]	CLELAND	82	SPEC	+	$50\ K^+ p \to K^0_S \pi^+ p$
$55 \quad \pm 4$	3600	[8,10]	CLELAND	82	SPEC	−	$50\ K^+ p \to K^0_S \pi^- p$
62.6 ± 3.8	380		DELFOSSE	81	SPEC	+	$50\ K^\pm p \to K^\pm \pi^0 p$
50.5 ± 3.9	187		DELFOSSE	81	SPEC	−	$50\ K^\pm p \to K^\pm \pi^0 p$

NEUTRAL ONLY

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
50.5±0.6 OUR FIT Error includes scale factor of 1.1.						
50.5±0.6 OUR AVERAGE Error includes scale factor of 1.1.						
50.8±0.8±0.9		ASTON	88	LASS	0	11 $K^- p \to K^- \pi^+ n$
46.5±4.3	5900	BARTH	83	HBC	0	70 $K^+ p \to K^+ \pi^- X$
54 ±2	28k	EVANGELISTA	80	OMEG	0	10 $\pi^- p \to K^+ \pi^- (\Lambda, \Sigma)$
45.9±4.8	1180	AGUILAR-...	78B	HBC	0	0.76 $\overline{p} p \to K^\mp K^0_S \pi^\pm$
51.2±1.7		WICKLUND	78	ASPK	0	3,4,6 $K^\pm N \to (K\pi)^0 N$
48.9±2.5		BOWLER	77	DBC	0	5.4 $K^+ d \to K^+ \pi^- p p$
$48\ ^{+3}_{-2}$	3600	MCCUBBIN	75	HBC	0	3.6 $K^- p \to K^- \pi^+ n$
50.6±2.5	22k	[9] PALER	75	HBC	0	14.3 $K^- p \to (K\pi)^0 X$
47 ±2	10k	FOX	74	RVUE	0	2 $K^- p \to K^- \pi^+ n$
51 ±2		FOX	74	RVUE	0	2 $K^+ n \to K^+ \pi^- p$
46.0±3.3	3186	[8] LEWIS	73	HBC	0	2.1–2.7 $K^+ p \to K \pi \pi p$
51.4±5.0	1700	[8] BUCHNER	72	DBC	0	4.6 $K^+ n \to K^+ \pi^- p$
$55.8^{+4.2}_{-3.4}$	2934	[8] AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \to K^- \pi^+ n$
48.5±2.7	5362	AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p \to K^- \pi^+ \pi^- p$
54.0±3.3	4300	[8,10] HABER	70	DBC	0	3 $K^- N \to K^- \pi^+ X$
53.2±2.1	10k	[8] DAVIS	69	HBC	0	12 $K^+ p \to K^+ \pi^- \pi^+ p$
44 ±5.5	1040	[8] DAUBER	67B	HBC	0	2.0 $K^- p \to K^- \pi^+ \pi^- p$

[7] From a partial wave amplitude analysis.
[8] Width errors enlarged by us to $4 \times \Gamma/\sqrt{N}$; see note.
[9] Inclusive reaction. Complicated background and phase-space effects.
[10] Number of events in peak reevaluated by us.

$K^*(892)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	$K\pi$	$\sim$ 100 %	
Γ_2	$(K\pi)^\pm$	(99.899±0.009) %	
Γ_3	$(K\pi)^0$	(99.770±0.020) %	
Γ_4	$K^0\gamma$	(2.30 ±0.20) $\times 10^{-3}$	
Γ_5	$K^\pm\gamma$	(1.01 ±0.09) $\times 10^{-3}$	
Γ_6	$K\pi\pi$	< 7 $\times 10^{-4}$	95%

CONSTRAINED FIT INFORMATION

An overall fit to the total width and a partial width uses 18 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 15.2$ for 16 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i, including the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_5	-100	
Γ	17	-17
	x_2	x_5

	Mode	Rate (MeV)
Γ_2	$(K\pi)^\pm$	49.8 ± 0.8
Γ_5	$K^\pm\gamma$	0.050 ± 0.005

CONSTRAINED FIT INFORMATION

An overall fit to the total width and a partial width uses 18 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 18.4$ for 16 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i \cdot \delta p_j)$, in percent, from the fit to parameters p_i, including the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_4	-100	
Γ	14	-14
	x_3	x_4

	Mode	Rate (MeV)	Scale factor
Γ_3	$(K\pi)^0$	50.4 ± 0.6	1.1
Γ_4	$K^0\gamma$	0.117 ± 0.010	

$K^*(892)$ PARTIAL WIDTHS

$\Gamma(K^0\gamma)$ Γ_4

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
116 ±10 OUR FIT						
116.5± 9.9	584	CARLSMITH	86	SPEC	0	$K_L^0 A \rightarrow K_S^0 \pi^0 A$

$\Gamma(K^{\pm}\gamma)$ Γ_5

VALUE (keV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
50± 5 OUR FIT					
50± 5 OUR AVERAGE					
48±11	BERG	83	SPEC	−	156 $K^- A \rightarrow \overline{K}\pi A$
51± 5	CHANDLEE	83	SPEC	+	200 $K^+ A \rightarrow K\pi A$

$K^*(892)$ BRANCHING RATIOS

$\Gamma(K^0\gamma)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (units 10^{-3})	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
2.30±0.20 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.5 ±0.7	CARITHERS	75B	CNTR	0	8–16 $\overline{K}^0 A$

$\Gamma(K^{\pm}\gamma)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
1.01±0.09 OUR FIT						
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.6	95	BEMPORAD	73	CNTR	+	10–16 $K^+ A$

$\Gamma(K\pi\pi)/\Gamma((K\pi)^{\pm})$ Γ_6/Γ_2

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
<0.0007	95	JONGEJANS	78	HBC		4 $K^- p \rightarrow p\overline{K}^0 2\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.002		WOJCICKI	64	HBC	−	1.7 $K^- p \rightarrow \overline{K}^0 \pi^- p$

$K^*(892)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
ATKINSON	86	ZPHY C30 521	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
CARLSMITH	86	PRL 56 18	+Bernstein, Peyaud, Turlay	(EFI, SACL)
BAUBILLIER	84B	ZPHY C26 37	+	(BIRM, CERN, GLAS, MICH, CURIN)
NAPIER	84	PL 149B 514	+Chen+	(TUFTS, ARIZ, FNAL, FLOR, NDAM+)
BARTH	83	NP B223 296	+Drevermann+	(BRUX, CERN, GENO, MONS+)
BERG	83	Thesis UMI 83-21652		(ROCH)
CHANDLEE	83	PRL 51 168	+Berg, Cihangir, Collick+	(ROCH, FNAL, MINN)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
DELFOSSE	81	NP B183 349	+Guisan, Martin, Muhlemann, Weill+	(GEVA, LAUS)
TOAFF	81	PR D23 1500	+Musgrave, Ammar, Davis, Ecklund+	(ANL, KANS)
AJINENKO	80	ZPHY C5 177	+Barth, Dujardin+	(SERP, BRUX, MONS, SACL)
EVANGELISTA	80	NP B165 383	+	(BARI, BONN, CERN, DARE, GLAS, LIVP+)
AGUILAR-...	78B	NP B141 101	Aguilar-Benitez+	(MADR, TATA, CERN+)
BALAND	78	NP B140 220	+Grard+	(MONS, BELG, CERN, LOIC, LALO)
COOPER	78	NP B136 365	+Gurtu+	(TATA, CERN, CDEF+)
JONGEJANS	78	NP B139 383	+Cerrada+	(ZEEM, CERN, NIJM, OXF)
WICKLUND	78	PR D17 1197	+Ayres, Diebold, Greene, Kramer, Pawlicki	(ANL)
BOWLER	77	NP B126 31	+Dainton, Drake, Williams	(OXF)
CARITHERS	75B	PRL 35 349	+Muhlemann, Underwood+	(ROCH, MCGI)

MCCUBBIN	75	NP B86 13	+Lyons	(OXF)
PALER	75	NP B96 1	+Tovey, Shah, Spiro+	(RHEL, SACL, EPOL)
FOX	74	NP B80 403	+Griss	(CIT)
MATISON	74	PR D9 1872	+Galtieri, Alston-Garnjost, Flatte, Friedman+	(LBL)
BEMPORAD	73	NP B51 1	+Beusch, Freudenreich+	(CERN, ETH, LOIC)
CLARK	73	NP B54 432	+Lyons, Radojicic	(OXF)
LEWIS	73	NP B60 283	+Allen, Jacobs+	(LOWC, LOIC, CDEF)
LINGLIN	73	NP B55 408		(CERN)
BUCHNER	72	NP B45 333	+Dehm, Charriere, Cornet+	(MPIM, CERN, BRUX)
AGUILAR-...	71B	PR D4 2583	Aguilar-Benitez, Eisner, Kinson	(BNL)
HABER	70	NP B17 289	+Shapira, Alexander+	(REHO, SACL, BGNA, EPOL)
CRENNELL	69D	PRL 22 487	+Karshon, Lai, O'Neall, Scarr	(BNL)
DAVIS	69	PRL 23 1071	+Derenzo, Flatte, Garnjost, Lynch, Solmitz	(LRL)
FRIEDMAN	69	Thesis UCRL 18860		(LRL)
DEWIT	68	Thesis		(ANIK)
SCHWEING...	68	PR 166 1317	Schweingruber, Derrick, Fields+	(ANL, NWES)
BARASH	67B	PR 156 1399	+Kirsch, Miller, Tan	(COLU)
BARLOW	67	NC 50A 701	+Lillestol, Montanet+	(CERN, CDEF, IRAD, LIVP)
DAUBER	67B	PR 153 1403	+Schlein, Slater, Ticho	(UCLA)
DEBAERE	67B	NC 51A 401	+Goldschmidt-Clermont, Henri+	(BRUX, CERN)
WOJCICKI	64	PR 135B 484		(LRL)

OTHER RELATED PAPERS

KAMAL	92	PL B284 421	+Xu	(ALBE)
NAPIER	84	PL 149B 514	+Chen+	(TUFTS, ARIZ, FNAL, FLOR, NDAM+)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
ALEXANDER	62	PRL 8 447	+Kalbfleisch, Miller, Smith	(LRL)
ALSTON	62B	CERN Conf. 291	+Ticho, Wojcicki+	(LRL)
ARMENTEROS	62C	CERN Conf. 295	+Astrer, Montanet+	(CERN, CDEF)
COLLEY	62B	CERN Conf. 315	+Gelfand+	(COLU, RUTG)
ALSTON	61	PRL 6 300	+Alvarez, Eberhard, Good+	(LRL)