$K_2^*(1430)$

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

We consider that phase-shift analyses provide more reliable determinations of the mass and width.

$K_2^*(1430)$ MASS

CHARGED ONLY, WITH FINAL STATE $K\pi$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1425.4± 1.3 OUR AVERAGE	Error includes scale factor of 1.1.					
1423.4± 2 ±3	24809±820	[1] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1420 ± 4	1587	BAUBILLIER	84B	HBC	−	8.25 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1436 ± 5.5	400	[2,3] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K_S^0 \pi^+ p$
1430 ± 3.2	1500	[2,3] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K_S^0 \pi^+ p$
1430 ± 3.2	1200	[2,3] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K_S^0 \pi^- p$
1423 ± 5	935	TOAFF	81	HBC	−	6.5 $K^- p \rightarrow \overline{K}^0 \pi^- p$
1428.0± 4.6		[4] MARTIN	78	SPEC	+	10 $K^\pm p \rightarrow K_S^0 \pi p$
1423.8± 4.6		[4] MARTIN	78	SPEC	−	10 $K^\pm p \rightarrow K_S^0 \pi p$
1420.0± 3.1	1400	AGUILAR-...	71B	HBC	−	3.9,4.6 $K^- p$
1425 ± 8.0	225	[2,3] BARNHAM	71C	HBC	+	$K^+ p \rightarrow K^0 \pi^+ p$
1416 ±10	220	CRENNELL	69D	DBC	−	3.9 $K^- N \rightarrow \overline{K}^0 \pi^- N$
1414 ±13.0	60	[2] LIND	69	HBC	+	9 $K^+ p \rightarrow K^0 \pi^+ p$
1427 ±12	63	[2] SCHWEING...	68	HBC	−	5.5 $K^- p \rightarrow \overline{K} \pi N$
1423 ±11.0	39	[2] BASSANO	67	HBC	−	4.6–5.0 $K^- p \rightarrow \overline{K}^0 \pi^- p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1432.4± 1.3 OUR AVERAGE						
1431.2± 1.8± 0.7		[5] ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
1434 ± 4 ± 6		[5] ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
1433 ± 6 ±10		[5] ASTON	84B	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$
1471 ±12		[5] BAUBILLIER	82B	HBC	0	8.25 $K^- p \rightarrow N K_S^0 \pi\pi$
1428 ± 3		[5] ASTON	81C	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
1434 ± 2		[5] ESTABROOKS	78	ASPK	0	13 $K^\pm p \rightarrow p K \pi$
1440 ±10		[5] BOWLER	77	DBC	0	5.5 $K^+ d \rightarrow K \pi p p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
1420 ± 7	300	HENDRICK	76	DBC		8.25 $K^+ N \rightarrow K^+ \pi N$
1421.6± 4.2	800	MCCUBBIN	75	HBC	0	3.6 $K^- p \rightarrow K^- \pi^+ n$
1420.1± 4.3		[6] LINGLIN	73	HBC	0	2–13 $K^+ p \rightarrow K^+ \pi^- X$
1419.1± 3.7	1800	AGUILAR-...	71B	HBC	0	3.9,4.6 $K^- p$
1416 ± 6	600	CORDS	71	DBC	0	9 $K^+ n \rightarrow K^+ \pi^- p$
1421.1± 2.6	2200	DAVIS	69	HBC	0	12 $K^+ p \rightarrow K^+ \pi^- X$

[1] From a partial wave amplitude analysis.
[2] Errors enlarged by us to $\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[3] Number of events in peak re-evaluated by us.
[4] Systematic error added by us.
[5] From phase shift or partial-wave analysis.
[6] From pole extrapolation, using world $K^+ p$ data summary tape.

$K_2^*(1430)$ WIDTH

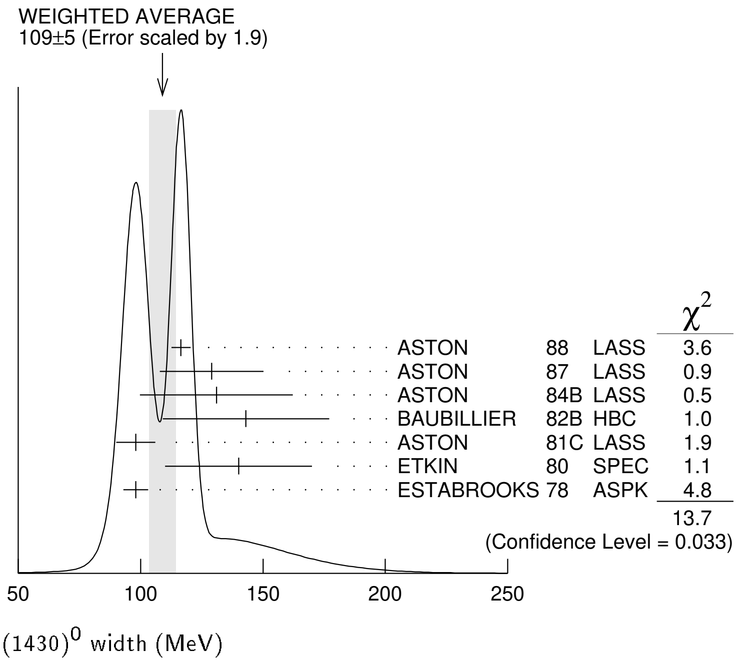
CHARGED ONLY, WITH FINAL STATE $K\pi$

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
98.4± 2.3 OUR FIT						
98.4± 2.4 OUR AVERAGE						
98 ± 4 ±4	24809±820	[7] BIRD	89	LASS	−	11 $K^- p \rightarrow \overline{K}^0 \pi^- p$
109 ±22	400	[8,9] CLELAND	82	SPEC	+	30 $K^+ p \rightarrow K_S^0 \pi^+ p$
124 ±12.8	1500	[8,9] CLELAND	82	SPEC	+	50 $K^+ p \rightarrow K_S^0 \pi^+ p$
113 ±12.8	1200	[8,9] CLELAND	82	SPEC	−	50 $K^+ p \rightarrow K_S^0 \pi^- p$

85 ±16	935	TOAFF 81	HBC	−	6.5 $K^- p \to \overline{K}^0 \pi^- p$
96.5± 3.8		MARTIN 78	SPEC	+	10 $K^\pm p \to K^0_S \pi p$
97.7± 4.0		MARTIN 78	SPEC	−	10 $K^\pm p \to K^0_S \pi p$
$94.7^{+15.1}_{-12.5}$	1400	AGUILAR-... 71B	HBC	−	3.9,4.6 $K^- p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
109 ± 5 OUR AVERAGE		Error includes scale factor of 1.9. See the ideogram below.			
116.5± 3.6± 1.7		[10] ASTON 88	LASS	0	11 $K^- p \to K^- \pi^+ n$
129 ±15 ±15		[10] ASTON 87	LASS	0	11 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
131 ±24 ±20		[10] ASTON 84B	LASS	0	11 $K^- p \to \overline{K}^0 2\pi n$
143 ±34		[10] BAUBILLIER 82B	HBC	0	8.25 $K^- p \to N K^0_S \pi\pi$
98 ± 8		[10] ASTON 81C	LASS	0	11 $K^- p \to K^- \pi^+ n$
140 ±30		[10] ETKIN 80	SPEC	0	6 $K^- p \to \overline{K}^0 \pi^+ \pi^- n$
98 ± 5		[10] ESTABROOKS 78	ASPK	0	13 $K^\pm p \to p K \pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
125 ±29	300	[8] HENDRICK 76	DBC		8.25 $K^+ N \to K^+ \pi N$
116 ±18	800	MCCUBBIN 75	HBC	0	3.6 $K^- p \to K^- \pi^+ n$
61 ±14		[11] LINGLIN 73	HBC	0	2–13 $K^+ p \to K^+ \pi^- X$
$116.6^{+10.3}_{-15.5}$	1800	AGUILAR-... 71B	HBC	0	3.9,4.6 $K^- p$
144 ±24.0	600	[8] CORDS 71	DBC	0	9 $K^+ n \to K^+ \pi^- p$
101 ±10	2200	DAVIS 69	HBC	0	12 $K^+ p \to K^+ \pi^- \pi^+ p$



[7] From a partial wave amplitude analysis.
[8] Errors enlarged by us to $4\Gamma/\sqrt{N}$; see the note with the $K^*(892)$ mass.
[9] Number of events in peak re-evaluated by us.
[10] From phase shift or partial-wave analysis.
[11] From pole extrapolation, using world $K^+ p$ data summary tape.

$K_2^*(1430)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$K\pi$	(49.7 ± 1.2) %	
Γ_2	$K^*(892)\pi$	(25.2 ± 1.7) %	
Γ_3	$K^*(892)\pi\pi$	(13.0 ± 2.3) %	
Γ_4	$K\rho$	(8.8 ± 0.8) %	S=1.2
Γ_5	$K\omega$	(2.9 ± 0.8) %	
Γ_6	$K^+\gamma$	$(2.4\pm0.5)\times10^{-3}$	
Γ_7	$K\eta$	$(1.4^{+2.8}_{-0.9})\times10^{-3}$	S=1.1
Γ_8	$K\omega\pi$	$<7.2\times10^{-4}$	CL=95%
Γ_9	$K^0\gamma$	$<9\times10^{-4}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to the total width, a partial width, and 10 branching ratios uses 28 measurements and one constraint to determine 8 parameters. The overall fit has a $\chi^2 = 19.5$ for 21 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_2	−16						
x_3	−33	−75					
x_4	−12	39	−54				
x_5	−11	−3	−25	−8			
x_6	−1	−1	−1	−1	0		
x_7	−3	−6	−4	−4	−2	0	
Γ	0	0	0	0	0	−13	0
	x_1	x_2	x_3	x_4	x_5	x_6	x_7

	Mode	Rate (MeV)	Scale factor
Γ_1	$K\pi$	48.9 ± 1.7	
Γ_2	$K^*(892)\pi$	24.8 ± 1.7	
Γ_3	$K^*(892)\pi\pi$	12.8 ± 2.3	
Γ_4	$K\rho$	8.7 ± 0.8	1.2
Γ_5	$K\omega$	2.9 ± 0.8	
Γ_6	$K^+\gamma$	0.24 ± 0.04	
Γ_7	$K\eta$	$0.14^{+0.28}_{-0.09}$	1.1

$K_2^*(1430)$ PARTIAL WIDTHS

$\Gamma(K^+\gamma)$ Γ_6

VALUE (keV)	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
240±40 OUR FIT					
240±45	CIHANGIR	82	SPEC	+	200 $K^+Z\to ZK^+\pi^0$, $ZK_S^0\pi^+$

$\Gamma(K^0\gamma)$ Γ_9

VALUE (keV)	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
<84	90	CARLSMITH	87	SPEC	0	60–200 $K_L^0 A\to K_S^0\pi^0 A$

$K_2^*(1430)$ BRANCHING RATIOS

$\Gamma(K\pi)/\Gamma_{total}$ — Γ_1/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.497±0.012 OUR FIT					
0.488±0.014 OUR AVERAGE					
0.485±0.006±0.020	[12] ASTON	88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$
0.49 ±0.02	[12] ESTABROOKS	78	ASPK	±	13 $K^\pm p \rightarrow p K \pi$

$\Gamma(K^*(892)\pi)/\Gamma(K\pi)$ — $\Gamma_2/\Gamma_1 = \Gamma_2/(\Gamma_1+\Gamma_2+\Gamma_4)$

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.47±0.10	BASSANO	67	HBC	−0	4.6,5.0 $K^- p$
0.45±0.13	[13] BADIER	65C	HBC	−	3 $K^- p$

$\Gamma(K\rho)/\Gamma(K\pi)$ — $\Gamma_4/\Gamma_1 = \Gamma_4/(\Gamma_1+\Gamma_2+\Gamma_4)$

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.14±0.10	BASSANO	67	HBC	−0	4.6,5.0 $K^- p$
0.14±0.07	[13] BADIER	65C	HBC	−	3 $K^- p$

$\Gamma(K^*(892)\pi)/\Gamma(K\pi)$ — Γ_2/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.51±0.04 OUR FIT					
0.48±0.05 OUR AVERAGE					
0.44±0.09	ASTON	84B	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$
0.62±0.19	LAUSCHER	75	HBC	0	10,16 $K^- p \rightarrow K^- \pi^+ n$
0.54±0.16	DEHM	74	DBC	0	4.6 $K^+ N$
0.47±0.08	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$

$\Gamma(K\omega)/\Gamma(K\pi)$ — Γ_5/Γ_1

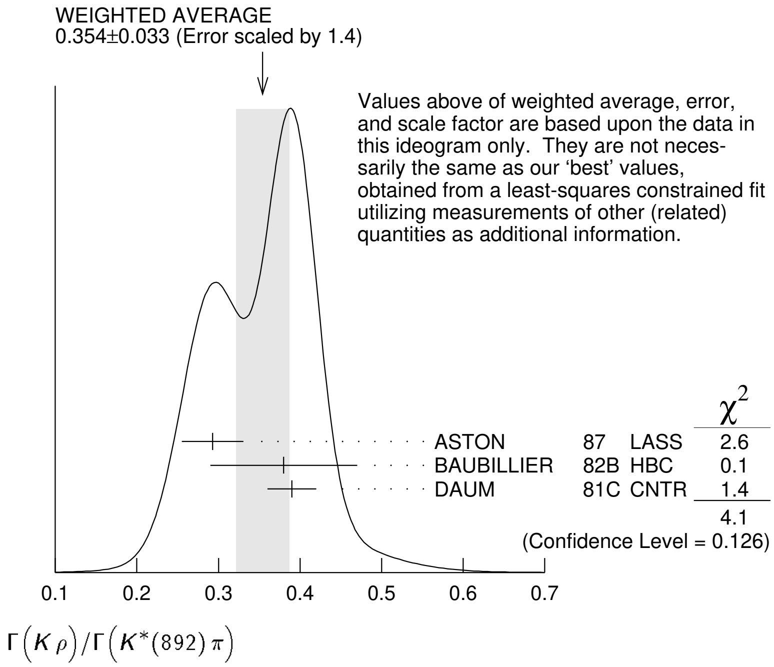
VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.059±0.017 OUR FIT					
0.070±0.035 OUR AVERAGE					
0.05 ±0.04	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$
0.13 ±0.07	BASSOMPIE...	69	HBC	0	5 $K^+ p$

$\Gamma(K\rho)/\Gamma(K\pi)$ — Γ_4/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.178±0.018 OUR FIT Error includes scale factor of 1.2.					
$0.153^{+0.034}_{-0.018}$ OUR AVERAGE					
0.18 ±0.05	ASTON	84B	LASS	0	11 $K^- p \rightarrow \overline{K}^0 2\pi n$
$0.02\ ^{+0.10}_{-0.02}$	DEHM	74	DBC	0	4.6 $K^+ N$
0.16 ±0.05	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$

$\Gamma(K\rho)/\Gamma(K^*(892)\pi)$ — Γ_4/Γ_2

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.351±0.032 OUR FIT Error includes scale factor of 1.5.					
0.354±0.033 OUR AVERAGE Error includes scale factor of 1.4. See the ideogram below.					
0.293±0.032±0.020	ASTON	87	LASS	0	11 $K^- p \rightarrow \overline{K}^0 \pi^+ \pi^- n$
0.38 ±0.09	BAUBILLIER	82B	HBC	0	8.25 $K^- p \rightarrow N K^0_S \pi\pi$
0.39 ±0.03	DAUM	81C	CNTR		63 $K^- p \rightarrow K^- 2\pi p$



$\Gamma(K\omega)/\Gamma(K^*(892)\pi)$ — Γ_5/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.116±0.034 OUR FIT					
0.10 ±0.04	FIELD	67	HBC	−	3.8 $K^- p$

$\Gamma(K\eta)/\Gamma(K^*(892)\pi)$ — Γ_7/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
$\mathbf{0.006^{+0.011}_{-0.004}}$ **OUR FIT**					
0.07 ±0.04	FIELD	67	HBC	−	3.8 $K^- p$

$\Gamma(K\eta)/\Gamma(K\pi)$ — Γ_7/Γ_1

VALUE	*CL%*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
$\mathbf{0.0028^{+0.0057}_{-0.0019}}$ **OUR FIT** Error includes scale factor of 1.1.						
0 ±0.0056		[14] ASTON	88B	LASS	−	11 $K^- p \to K^- \eta p$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.04	95	AGUILAR-...	71B	HBC		3.9,4.6 $K^- p$
<0.065		[13] BASSOMPIE...	69	HBC		5.0 $K^+ p$
<0.02		BISHOP	69	HBC		3.5 $K^+ p$

$\Gamma(K^*(892)\pi\pi)/\Gamma_{total}$ — Γ_3/Γ

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.130±0.023 OUR FIT					
0.12 ±0.04	[15] GOLDBERG	76	HBC	−	3 $K^- p \to p \overline{K}^0 \pi\pi\pi$

$\Gamma(K^*(892)\pi\pi)/\Gamma(K\pi)$ — Γ_3/Γ_1

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.26±0.05 OUR FIT					
0.21±0.08	[13,15] JONGEJANS	78	HBC	−	4 $K^- p \to p \overline{K}^0 \pi\pi\pi$

$\Gamma(K\omega\pi)/\Gamma_{total}$ — Γ_8/Γ

VALUE (units 10^{-3})	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.72	95	0	JONGEJANS	78	HBC	4 $K^- p \to p \overline{K}^0 4\pi$

[12] From phase shift analysis.
[13] Restated by us.
[14] ASTON 88B quote < 0.0092 at CL=95%. We convert this to a central value and 1 sigma error in order to be abe to use it in our constrained fit.
[15] Assuming $\pi\pi$ system has isospin 1, which is supported by the data.

$K_2^*(1430)$ REFERENCES

BIRD	89	SLAC-332		(SLAC)
ASTON	88	NP B296 493	+Awaji, Bienz, Bird+	(SLAC, NAGO, CINC, INUS)
ASTON	88B	PL B201 169	+Awaji, Bienz+	(SLAC, NAGO, CINC, INUS)
ASTON	87	NP B292 693	+Awaji, D'Amore+	(SLAC, NAGO, CINC, INUS)
CARLSMITH	87	PR D36 3502	+Bernstein, Bock, Coupal, Peyaud, Turlay+	(EFI, SACL)
ASTON	84B	NP B247 261	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA)
BAUBILLIER	84B	ZPHY C26 37	+	(BIRM, CERN, GLAS, MICH, CURIN)
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)
CIHANGIR	82	PL 117B 123	+Berg, Biel, Chandlee+	(FNAL, MINN, ROCH)
CLELAND	82	NP B208 189	+Delfosse, Dorsaz, Gloor	(DURH, GEVA, LAUS, PITT)
ASTON	81C	PL 106B 235	+Carnegie, Dunwoodie+	(SLAC, CARL, OTTA) JP
DAUM	81C	NP B187 1	+Hertzberger+	(AMST, CERN, CRAC, MPIM, OXF+)
TOAFF	81	PR D23 1500	+Musgrave, Ammar, Davis, Ecklund+	(ANL, KANS)
ETKIN	80	PR D22 42	+Foley, Lindenbaum, Kramer+	(BNL, CUNY) JP
ESTABROOKS	78	NP B133 490	+Carnegie+	(MCGI, CARL, DURH, SLAC)
Also	78B	PR D17 658	Estabrooks, Carnegie+	(MCGI, CARL, DURH+)
JONGEJANS	78	NP B139 383	+Cerrada+	(ZEEM, CERN, NIJM, OXF)
MARTIN	78	NP B134 392	+Shimada, Baldi, Bohringer+	(DURH, GEVA)
BOWLER	77	NP B126 31	+Dainton, Drake, Williams	(OXF)
GOLDBERG	76	LNC 17 253		(HAIF)
HENDRICK	76	NP B112 189	+Vignaud, Burlaud+	(MONS, SACL, PARIS, BELG)
LAUSCHER	75	NP B86 189	+Otter, Wieczorek+	(ABCLV Collab.) JP
MCCUBBIN	75	NP B86 13	+Lyons	(OXF)
DEHM	74	NP B75 47	+Goebel, Wittek+	(MPIM, BRUX, MONS, CERN)
LINGLIN	73	NP B55 408		(CERN)
AGUILAR-...	71B	PR D4 2583	Aguilar-Benitez, Eisner, Kinson	(BNL)
BARNHAM	71C	NP B28 171	+Colley, Jobes, Griffiths, Hughes+	(BIRM, GLAS)
CORDS	71	PR D4 1974	+Carmony, Erwin, Meiere+	(PURD, UCD, IUPU)
BASSOMPIE...	69	NP B13 189	Bassompierre+	(CERN, BRUX) JP
BISHOP	69	NP B9 403	+Goshaw, Erwin, Walker	(WISC)
CRENNELL	69D	PRL 22 487	+Karshon, Lai, O'Neall, Scarr	(BNL)
DAVIS	69	PRL 23 1071	+Derenzo, Flatte, Garnjost, Lynch, Solmitz	(LRL)
LIND	69	NP B14 1	+Alexander, Firestone, Fu, Goldhaber	(LRL) JP
SCHWEING...	68	PR 166 1317	Schweingruber, Derrick, Fields+	(ANL, NWES)
Also	67	Thesis	Schweingruber	(NWES, NWES)
BASSANO	67	PRL 19 968	+Goldberg, Goz, Barnes, Leitner+	(BNL, SYRA)
FIELD	67	PL 24B 638	+Hendricks, Piccioni, Yager	(UCSD)
BADIER	65C	PL 19 612	+Demoulin, Goldberg+	(EPOL, SACL, AMST)

OTHER RELATED PAPERS

ATKINSON	86	ZPHY C30 521	+	(BONN, CERN, GLAS, LANC, MCHS, CURIN+)
BAUBILLIER	82B	NP B202 21	+	(BIRM, CERN, GLAS, MSU, CURIN)
CHUNG	65	PRL 15 325	+Dahl, Hardy, Hess, Jacobs, Kirz	(LRL)
FOCARDI	65	PL 16 351	+Ranzi, Serra+	(BGNA, SACL)
HAQUE	65	PL 14 338	Hague+	
HARDY	65	PRL 14 401	+Chung, Dahl, Hess, Kirz, Miller	(LRL)