

$K_2^*(1430)$ $I(J^P) = \frac{1}{2}(2^+)$

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
1425.6 ± 1.5 OUR AVERAGE					
		Error includes scale factor of 1.1.			
1420 \pm 4	1587	BAUBILLIER	84B	HBC	$- 8.25 K^- p \rightarrow \bar{K}^0 \pi^- p$
1436 \pm 5.5	400	1,2 CLELAND	82	SPEC	$+ 30 K^+ p \rightarrow K_S^0 \pi^+ p$
1430 \pm 3.2	1500	1,2 CLELAND	82	SPEC	$+ 50 K^+ p \rightarrow K_S^0 \pi^+ p$
1430 \pm 3.2	1200	1,2 CLELAND	82	SPEC	$- 50 K^+ p \rightarrow K_S^0 \pi^- p$
1423 \pm 5	935	TOAFF	81	HBC	$- 6.5 K^- p \rightarrow \bar{K}^0 \pi^- p$
		3 MARTIN	78	SPEC	$+ 10 K^\pm p \rightarrow K_S^0 \pi p$
1423.8 \pm 4.6		3 MARTIN	78	SPEC	$- 10 K^\pm p \rightarrow K_S^0 \pi p$
1420.0 \pm 3.1	1400	AGUILAR...	71B	HBC	$- 3.9, 4.6 K^- p$
1425 \pm 8.0	225	1,2 BARNHAM	71C	HBC	$+ K^+ p \rightarrow K^0 \pi^+ p$
1416 \pm 10	220	CRENNELL	69D	DBC	$- 3.9 \frac{K^- N}{\bar{K}^0 \pi^- N}$
1414 \pm 13.0	60	1 LIND	69	HBC	$+ 9 K^+ p \rightarrow K^0 \pi^+ p$
1427 \pm 12	63	1 SCHWEING...	68	HBC	$- 5.5 K^- p \rightarrow \bar{K} \pi N$
1423 \pm 11.0	39	1 BASSANO	67	HBC	$- 4.6-5.0 K^- p \rightarrow \bar{K}^0 \pi^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1423.4 \pm 2 \pm 3	24809 \pm 820	4 BIRD	89	LASS	$- 11 K^- p \rightarrow \bar{K}^0 \pi^- p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
1432.4 ± 1.3 OUR AVERAGE					
1431.2 \pm 1.8 \pm 0.7	5 ASTON	88	LASS	$11 K^- p \rightarrow K^- \pi^+ n$	
1434 \pm 4 \pm 6	5 ASTON	87	LASS	$11 K^- p \rightarrow \bar{K}^0 \pi^+ \pi^- n$	
1433 \pm 6 \pm 10	5 ASTON	84B	LASS	$11 K^- p \rightarrow \bar{K}^0 \pi^- n$	
1471 \pm 12	5 BAUBILLIER	82B	HBC	$8.25 K^- p \rightarrow N K_S^0 \pi \pi$	
1428 \pm 3	5 ASTON	81C	LASS	$11 K^- p \rightarrow K^- \pi^+ n$	
1434 \pm 2	5 ESTABROOKS	78	ASPK	$13 K^\pm p \rightarrow p K \pi$	
1440 \pm 10	5 BOWLER	77	DBC	$5.5 K^+ d \rightarrow K \pi pp$	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1428.5 \pm 3.9	1786 \pm 127	6 AUBERT	07AK BABR	$10.6 e^+ e^- \rightarrow K^{*0} K^\pm \pi^\mp \gamma$	
1420 \pm 7	300	HENDRICK	76	DBC	$8.25 K^+ N \rightarrow K^+ \pi N$
1421.6 \pm 4.2	800	MCCUBBIN	75	HBC	$3.6 K^- p \rightarrow K^- \pi^+ n$
1420.1 \pm 4.3	7 LINGLIN	73	HBC	$2-13 K^+ p \rightarrow K^+ \pi^- X$	
1419.1 \pm 3.7	1800	AGUILAR...	71B	HBC	$3.9, 4.6 K^- p$
1416 \pm 6	600	CORDS	71	DBC	$9 K^+ n \rightarrow K^+ \pi^- p$
1421.1 \pm 2.6	2200	DAVIS	69	HBC	$12 K^+ p \rightarrow K^+ \pi^- X$

¹ Errors enlarged by us to Γ/\sqrt{N} ; see the note with the $K^*(892)$ mass.² Number of events in peak re-evaluated by us.³ Systematic error added by us.⁴ From a partial wave amplitude analysis.⁵ From phase shift or partial-wave analysis.⁶ Systematic errors not estimated.⁷ From pole extrapolation, using world $K^+ p$ data summary tape.

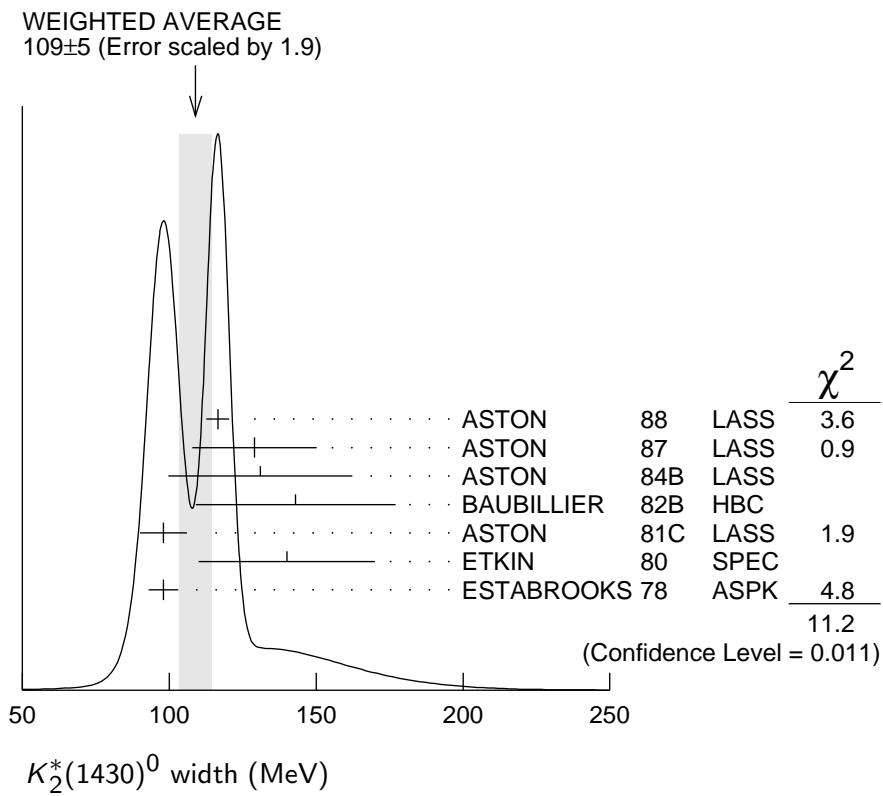
$K_2^*(1430)$ WIDTH

CHARGED ONLY, WITH FINAL STATE $K\pi$

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
98.5 ± 2.7 OUR FIT	Error includes scale factor of 1.1.				
98.5 ± 2.9 OUR AVERAGE	Error includes scale factor of 1.1.				
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 -	$6.5 K^- p \rightarrow \bar{K}^0 \pi^- p$
96.5 ± 3.8		MARTIN	78	SPEC +	$10 K^\pm p \rightarrow K_S^0 \pi p$
97.7 ± 4.0		MARTIN	78	SPEC -	$10 K^\pm p \rightarrow K_S^0 \pi p$
94.7 ± 15.1	1400	AGUILAR-...	71B	HBC -	3.9,4.6 $K^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
98 ± 4 ± 4	24809 ± 820	10 BIRD	89	LASS -	$11 K^- p \rightarrow \bar{K}^0 \pi^- p$

NEUTRAL ONLY

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
109 ± 5 OUR AVERAGE	Error includes scale factor of 1.9. See the ideogram below.			
116.5 ± 3.6 ± 1.7	11 ASTON	88 LASS	11	$K^- p \rightarrow K^- \pi^+ n$
129 ± 15 ± 15	11 ASTON	87 LASS	11	$K^- p \rightarrow \bar{K}^0 \pi^+ \pi^- n$
131 ± 24 ± 20	11 ASTON	84B LASS	11	$K^- p \rightarrow \bar{K}^0 2\pi n$
143 ± 34	11 BAUBILLIER	82B HBC	8.25	$K^- p \rightarrow N K_S^0 \pi \pi$
98 ± 8	11 ASTON	81C LASS	11	$K^- p \rightarrow K^- \pi^+ n$
140 ± 30	11 ETKIN	80 SPEC	6	$K^- p \rightarrow \bar{K}^0 \pi^+ \pi^- n$
98 ± 5	11 ESTABROOKS	78 ASPK	13	$K^\pm p \rightarrow p K\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
113.7 ± 9.2	1786 ± 127	12 AUBERT	07AK BABR	$10.6 e^+ e^- \rightarrow K^{*0} K^\pm \pi^\mp \gamma$
125 ± 29	300	8 HENDRICK	76 DBC	$8.25 K^+ N \rightarrow K^+ \pi^- N$
116 ± 18	800	MCCUBBIN	75 HBC	$3.6 K^- p \rightarrow K^- \pi^+ n$
61 ± 14	13 LINGLIN	73 HBC	2-13	$K^+ p \rightarrow K^+ \pi^- X$
116.6 ± 10.3	1800	AGUILAR-...	71B	3.9,4.6 $K^- p$
144 ± 24.0	600	8 CORDS	71 DBC	$9 K^+ n \rightarrow K^+ \pi^- p$
101 ± 10	2200	DAVIS	69 HBC	$12 K^+ p \rightarrow K^+ \pi^- \pi^+ p$



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 a partial wave amplitude analysis.

¹¹ From phase shift or partial-wave analysis.

¹² Systematic errors not estimated.

¹³ 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 $K\pi$	(49.9 \pm 1.2) %	
Γ_2 $K^*(892)\pi$	(24.7 \pm 1.5) %	
Γ_3 $K^*(892)\pi\pi$	(13.4 \pm 2.2) %	
Γ_4 $K\rho$	(8.7 \pm 0.8) %	S=1.2
Γ_5 $K\omega$	(2.9 \pm 0.8) %	
Γ_6 $K^+\gamma$	(2.4 \pm 0.5) $\times 10^{-3}$	S=1.1
Γ_7 $K\eta$	(1.5 $^{+3.4}_{-1.0}) \times 10^{-3}$	S=1.3
Γ_8 $K\omega\pi$	< 7.2 $\times 10^{-4}$	CL=95%
Γ_9 $K^0\gamma$	< 9 $\times 10^{-4}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to the total width, a partial width, and 10 branching ratios uses 31 measurements and one constraint to determine 8 parameters. The overall fit has a $\chi^2 = 20.2$ for 24 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta p_i \delta p_j \rangle / (\delta p_i \cdot \delta p_j)$, 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	-9						
x_3	-40 -73						
x_4	-8 36 -52						
x_5	-11 -3 -26 -7						
x_6	-1 -1 -1 -1 0						
x_7	-4 -7 -5 -5 -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
$\Gamma_1 K\pi$	49.1 ± 1.8	
$\Gamma_2 K^*(892)\pi$	24.3 ± 1.6	
$\Gamma_3 K^*(892)\pi\pi$	13.2 ± 2.2	
$\Gamma_4 K\rho$	8.5 ± 0.8	1.2
$\Gamma_5 K\omega$	2.9 ± 0.8	
$\Gamma_6 K^+\gamma$	0.24 ± 0.05	1.1
$\Gamma_7 K\eta$	$0.15^{+0.33}_{-0.10}$	1.3

$K_2^*(1430)$ PARTIAL WIDTHS

$\Gamma(K^+\gamma)$	Γ_6
<u>VALUE (keV)</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>CHG</u> <u>COMMENT</u>
241 ± 50 OUR FIT	Error includes scale factor of 1.1.
240 ± 45	CIHANGIR 82 SPEC + $200 K^+ Z \rightarrow Z K^+ \pi^0, Z K_S^0 \pi^+$

$\Gamma(K^0\gamma)$	Γ_9
<u>VALUE (keV)</u>	<u>CL%</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>CHG</u> <u>COMMENT</u>
< 5.4	90 ALAVI-HARATI02B KTEV $K + A \rightarrow K^* + A$
• • • We do not use the following data for averages, fits, limits, etc. • • •	
<84	90 CARLSMITH 87 SPEC 0 $60-200 K_L^0 A \rightarrow K_S^0 \pi^0 A$

$K_2^*(1430)$ BRANCHING RATIOS **$\Gamma(K\pi)/\Gamma_{\text{total}}$**

VALUE	DOCUMENT ID	TECN	CHG	COMMENT	Γ_1/Γ
0.499±0.012 OUR FIT					
0.488±0.014 OUR AVERAGE					
0.485±0.006±0.020	¹⁴ ASTON 88	LASS	0	11 $K^- p \rightarrow K^- \pi^+ n$	
0.49 ± 0.02	¹⁴ ESTABROOKS 78	ASPK	±	13 $K^\pm p \rightarrow p K\pi$	

 $\Gamma(K^*(892)\pi)/\Gamma(K\pi)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT	Γ_2/Γ_1
0.496±0.034 OUR FIT					
0.47 ± 0.04 OUR AVERAGE					
0.44 ± 0.09	ASTON 84B	LASS	0	11 $K^- p \rightarrow \bar{K}^0 2\pi n$	
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 $K^- p$	
0.47 ± 0.10	BASSANO 67	HBC	-0	4.6,5.0 $K^- p$	
0.45 ± 0.13	BADIER 65C	HBC	-	3 $K^- p$	

 $\Gamma(K\omega)/\Gamma(K\pi)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT	Γ_5/Γ_1
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 $K^+ p$	

 $\Gamma(K\rho)/\Gamma(K\pi)$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT	Γ_4/Γ_1
0.174±0.017 OUR FIT					
Error includes scale factor of 1.2.					

 $0.150^{+0.029}_{-0.017}$ OUR AVERAGE

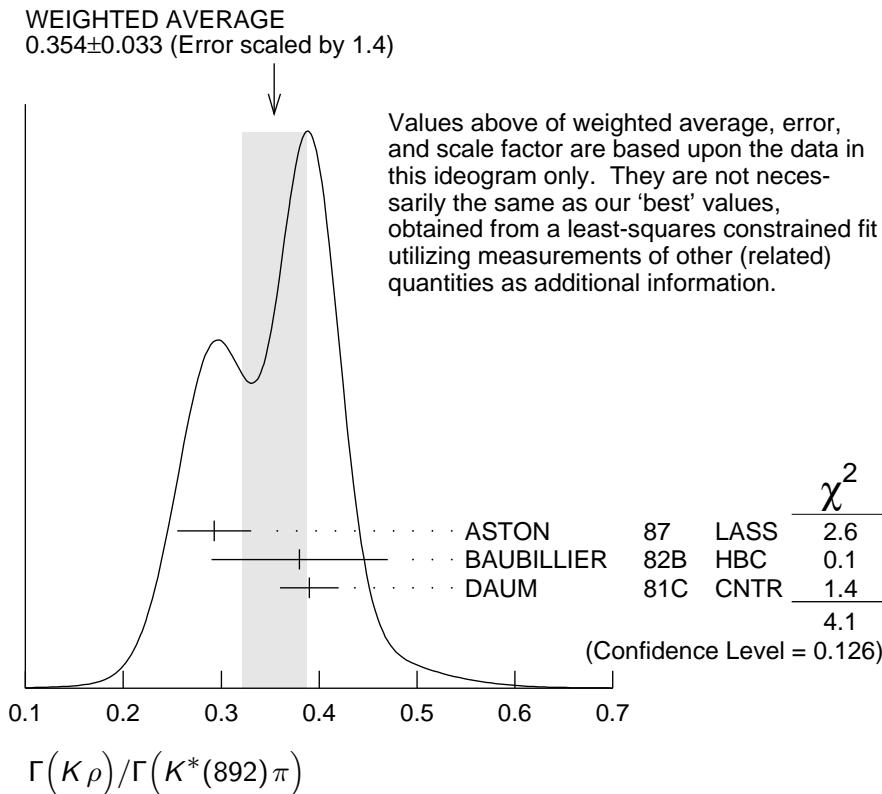
0.18 ± 0.05	ASTON 84B	LASS	0	11 $K^- p \rightarrow \bar{K}^0 2\pi n$	
0.02 +0.10 -0.02	DEHM 74	DBC	0	4.6 $K^+ N$	
0.16 ± 0.05	AGUILAR-... 71B	HBC		3.9,4.6 $K^- p$	
0.14 ± 0.10	BASSANO 67	HBC	-0	4.6,5.0 $K^- p$	
0.14 ± 0.07	BADIER 65C	HBC	-	3 $K^- p$	

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT	Γ_4/Γ_2
0.350±0.031 OUR FIT					
Error includes scale factor of 1.4.					

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 $K^- p \rightarrow \bar{K}^0 \pi^+ \pi^- n$	
0.38 ± 0.09	BAUBILLIER 82B	HBC	0	8.25 $K^- p \rightarrow N K_S^0 \pi\pi$	
0.39 ± 0.03	DAUM 81C	CNTR		63 $K^- p \rightarrow K^- 2\pi p$	



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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.118±0.034 OUR FIT				
0.10 ±0.04	FIELD	67	HBC	— 3.8 $K^- p$

Γ_5/Γ_2

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.006^{+0.014}_{-0.004} OUR FIT				Error includes scale factor of 1.2.
0.07 ±0.04	FIELD	67	HBC	— 3.8 $K^- p$

Γ_7/Γ_2

$\Gamma(K\eta)/\Gamma(K\pi)$

VALUE	CL%	DOCUMENT ID	TECN	CHG	COMMENT
0.0030^{+0.0070}_{-0.0020} OUR FIT					Error includes scale factor of 1.3.
0 ±0.0056	15	ASTON	88B	LASS	— 11 $K^- p \rightarrow K^- \eta p$

Γ_7/Γ_1

• • • 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 16 BASSOMPIE... 69 HBC 5.0 $K^+ p$
<0.02 BISHOP 69 HBC 3.5 $K^+ p$

$\Gamma(K^*(892)\pi\pi)/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.134±0.022 OUR FIT				
0.12 ±0.04	17	GOLDBERG	76	HBC — 3 $K^- p \rightarrow p\bar{K}^0\pi\pi\pi$

Γ_3/Γ

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

VALUE	DOCUMENT ID	TECN	CHG	COMMENT
0.27±0.05 OUR FIT				
0.21±0.08	16,17 JONGEJANS 78 HBC —			$4 K^- p \rightarrow p\bar{K}^0 \pi\pi\pi$

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

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

¹⁴ From phase shift analysis.¹⁵ ASTON 88B quote < 0.0092 at CL=95%. We convert this to a central value and 1 sigma error in order to be able to use it in our constrained fit.¹⁶ Restated by us.¹⁷ Assuming $\pi\pi$ system has isospin 1, which is supported by the data. **$K_2^*(1430)$ REFERENCES**

AUBERT	07AK	PR D76 012008	B. Aubert <i>et al.</i>	(BABAR Collab.)
ALAVI-HARATI	02B	PRL 89 072001	A. Alavi-Harati <i>et al.</i>	(FNAL KTeV Collab.)
BIRD	89	SLAC-332	P.F. Bird	(SLAC)
ASTON	88	NP B296 493	D. Aston <i>et al.</i>	(SLAC, NAGO, CINC, INUS)
ASTON	88B	PL B201 169	D. Aston <i>et al.</i>	(SLAC, NAGO, CINC, INUS)
ASTON	87	NP B292 693	D. Aston <i>et al.</i>	(SLAC, NAGO, CINC, INUS)
CARLSMITH	87	PR D36 3502	D. Carlsmith <i>et al.</i>	(EFI, SACL)
ASTON	84B	NP B247 261	D. Aston <i>et al.</i>	(SLAC, CARL, OTTA)
BAUBILLIER	84B	ZPHY C26 37	M. Baubillier <i>et al.</i>	(BIRM, CERN, GLAS+)
BAUBILLIER	82B	NP B202 21	M. Baubillier <i>et al.</i>	(BIRM, CERN, GLAS+)
CIHANGIR	82	PL 117B 123	S. Cihangir <i>et al.</i>	(FNAL, MINN, ROCH)
CLELAND	82	NP B208 189	W.E. Cleland <i>et al.</i>	(DURH, GEVA, LAUS+)
ASTON	81C	PL 106B 235	D. Aston <i>et al.</i>	(SLAC, CARL, OTTA) JP
DAUM	81C	NP B187 1	C. Daum <i>et al.</i>	(AMST, CERN, CRAC, MPIM+)
TOAFF	81	PR D23 1500	S. Toaff <i>et al.</i>	(ANL, KANS)
ETKIN	80	PR D22 42	A. Etkin <i>et al.</i>	(BNL, CUNY) JP
ESTABROOKS	78	NP B133 490	P.G. Estabrooks <i>et al.</i>	(MCGI, CARL, DURH+)
Also		PR D17 658	P.G. Estabrooks <i>et al.</i>	(MCGI, CARL, DURH+)
JONGEJANS	78	NP B139 383	B. Jongejans <i>et al.</i>	(ZEEM, CERN, NIJM+)
MARTIN	78	NP B134 392	A.D. Martin <i>et al.</i>	(DURH, GEVA)
BOWLER	77	NP B126 31	M.G. Bowler <i>et al.</i>	(OXF)
GOLDBERG	76	LNC 17 253	J. Goldberg	(HAIF)
HENDRICK	76	NP B112 189	K. Hendrickx <i>et al.</i>	(MONS, SACL, PARIS+)
LAUSCHER	75	NP B86 189	P. Lauscher <i>et al.</i>	(ABCLV Collab.) JP
MCCUBBIN	75	NP B86 13	N.A. McCubbin, L. Lyons	(OXF)
DEHM	74	NP B75 47	G. Dehm <i>et al.</i>	(MPIM, BRUX, MONS, CERN)
LINGLIN	73	NP B55 408	D. Linglin	(CERN)
AGUILAR-...	71B	PR D4 2583	M. Aguilar-Benitez, R.L. Eisner, J.B. Kinson	(BNL)
BARNHAM	71C	NP B28 171	K.W.J. Barnham <i>et al.</i>	(BIRM, GLAS)
CORDS	71	PR D4 1974	D. Cords <i>et al.</i>	(PURD, UCD, IUPU)
BASSOMPIER...	69	NP B13 189	G. Bassompierre <i>et al.</i>	(CERN, BRUX) JP
BISHOP	69	NP B9 403	J.M. Bishop <i>et al.</i>	(WISC)
CRENNELL	69D	PRL 22 487	D.J. Crennell <i>et al.</i>	(BNL)
DAVIS	69	PRL 23 1071	P.J. Davis <i>et al.</i>	(LRL)
LIND	69	NP B14 1	V.G. Lind <i>et al.</i>	(LRL) JP
SCHWEINGR...	68	PR 166 1317	F. Schweingruber <i>et al.</i>	(ANL, NWES)
Also		Thesis	F.L. Schweingruber	(NWES, NWES)
BASSANO	67	PRL 19 968	D. Bassano <i>et al.</i>	(BNL, SYRA)
FIELD	67	PL 24B 638	J.H. Field <i>et al.</i>	(UCSD)
BADIER	65C	PL 19 612	J. Badier <i>et al.</i>	(EPOL, SACL, AMST)

— OTHER RELATED PAPERS —

ABLIKIM	05Q	PR D72 092002	M. Ablikim <i>et al.</i>	(BES Collab.)
AUBERT,B	04O	PR D70 091103R	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT,B	04P	PR D70 092001	B. Aubert <i>et al.</i>	(BABAR Collab.)
VANBEVEREN	01B	EPJ C22 493	E. van Beveren	
BARBERIS	98E	PL B436 204	D. Barberis <i>et al.</i>	(Omega Expt.)
ATKINSON	86	ZPHY C30 521	M. Atkinson <i>et al.</i>	(BONN, CERN, GLAS+)
BAUBILLIER	82B	NP B202 21	M. Baubillier <i>et al.</i>	(BIRM, CERN, GLAS+)
CHUNG	65	PRL 15 325	S.U. Chung <i>et al.</i>	(LRL)
FOCARDI	65	PL 16 351	S. Focardi <i>et al.</i>	(BGNA, SACL)
HAQUE	65	PL 14 338	N. Haque <i>et al.</i>	
HARDY	65	PRL 14 401	L.M. Hardy <i>et al.</i>	(LRL)