NODE=B066

$N(1650)\ 1/2^-$

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

Older and obsolete values are listed and referenced in the 2014 edition, Chinese Physics **C38** 070001 (2014).

NODE=B066

$N(1650)$ POLE POSITION

NODE=B066215

REAL PART

NODE=B066RE

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1650 to 1680 (≈ 1665) OUR ESTIMATE				
1678± 2	ROENCHEN	22	DPWA	Multichannel
1664± 4	AFZAL	20	DPWA	Multichannel
1658±10	ANISOVICH	17A	DPWA	Multichannel
1660± 5	[1] ANISOVICH	17A	L+P	$\gamma p,\ \pi^- p \to K\Lambda$
1660± 3.5±1	[2] SVARC	14	L+P	$\pi N \to \pi N$
1640±20	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1656	HUNT	19	DPWA	Multichannel
1672	ROENCHEN	15A	DPWA	Multichannel
1652± 7	SOKHOYAN	15A	DPWA	Multichannel
1650	SHKLYAR	13	DPWA	Multichannel
1647± 6	ANISOVICH	12A	DPWA	Multichannel
1646± 8	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
1648	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
1663	VRANA	00	DPWA	Multichannel
1670	HOEHLER	93	ARGD	$\pi N \to \pi N$

[1] Statistical error only.
[2] Fit to the amplitudes of HOEHLER 79.

NODE=B066RE;LINKAGE=A
NODE=B066RE;LINKAGE=SV

−2×IMAGINARY PART

NODE=B066IM

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
100 to 170 (≈ 135) OUR ESTIMATE				
127± 2	ROENCHEN	22	DPWA	Multichannel
98± 6	AFZAL	20	DPWA	Multichannel
102± 8	ANISOVICH	17A	DPWA	Multichannel
59±16	[1] ANISOVICH	17A	L+P	$\gamma p,\ \pi^- p \to K\Lambda$
167± 8±2	[2] SVARC	14	L+P	$\pi N \to \pi N$
150±30	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
130	HUNT	19	DPWA	Multichannel
137	ROENCHEN	15A	DPWA	Multichannel
102± 8	SOKHOYAN	15A	DPWA	Multichannel
89	SHKLYAR	13	DPWA	Multichannel
103± 8	ANISOVICH	12A	DPWA	Multichannel
204±17	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
80	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
240	VRANA	00	DPWA	Multichannel
163	HOEHLER	93	ARGD	$\pi N \to \pi N$

[1] Statistical error only.
[2] Fit to the amplitudes of HOEHLER 79.

NODE=B066IM;LINKAGE=A
NODE=B066IM;LINKAGE=SV

$N(1650)$ ELASTIC POLE RESIDUE

NODE=B066220

MODULUS $|r|$

NODE=B066RER

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
25 to 55 (≈ 45) OUR ESTIMATE				
59±11	ROENCHEN	22	DPWA	Multichannel
27± 6	SOKHOYAN	15A	DPWA	Multichannel
47± 3±1	[1] SVARC	14	L+P	$\pi N \to \pi N$
60±10	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
37	ROENCHEN	15A	DPWA	Multichannel
19	SHKLYAR	13	DPWA	Multichannel
24± 3	ANISOVICH	12A	DPWA	Multichannel
100	BATINIC	10	DPWA	$\pi N \to N\pi,\ N\eta$
14	ARNDT	06	DPWA	$\pi N \to \pi N,\ \eta N$
39	HOEHLER	93	ARGD	$\pi N \to \pi N$

[1] Fit to the amplitudes of HOEHLER 79.

NODE=B066RER;LINKAGE=SV

PHASE θ

NODE=B066IMR
NODE=B066IMR

VALUE (°)	DOCUMENT ID		TECN	COMMENT
−80 to −50 (≈ −70) OUR ESTIMATE				→ UNCHECKED ←
−18±23	ROENCHEN	22	DPWA	Multichannel
−60±20	SOKHOYAN	15A	DPWA	Multichannel
−47± 3±1	[1] SVARC	14	L+P	$\pi N \to \pi N$
−75±25	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−59	ROENCHEN	15A	DPWA	Multichannel
−46	SHKLYAR	13	DPWA	Multichannel
−75±12	ANISOVICH	12A	DPWA	Multichannel
−65	BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$
−69	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
−37	HOEHLER	93	ARGD	$\pi N \to \pi N$

[1] Fit to the amplitudes of HOEHLER 79.

NODE=B066IMR;LINKAGE=SV

N(1650) INELASTIC POLE RESIDUE

NODE=B066250

The "normalized residue" is the residue divided by $\Gamma_{pole}/2$.

NODE=B066250

Normalized residue in $N\pi \to N(1650) \to N\eta$

NODE=B066RS1
NODE=B066RS1

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.34±0.06	71 ± 23	ROENCHEN	22	DPWA	Multichannel
0.29±0.03	134 ± 10	ANISOVICH	12A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.21	48	ROENCHEN	15A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1650) \to \Lambda K$

NODE=B066RS2
NODE=B066RS2

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.26±0.05	−40 ± 23	ROENCHEN	22	DPWA	Multichannel
0.26±0.10	110 ± 20	ANISOVICH	17A	DPWA	Multichannel
0.10±0.10	95 ± 33	[1] ANISOVICH	17A	L+P	$\gamma p, \pi^- p \to K\Lambda$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.20	−54	ROENCHEN	15A	DPWA	Multichannel
0.23±0.09	85 ± 9	ANISOVICH	12A	DPWA	Multichannel

OCCUR=2

[1] Statistical error only.

NODE=B066RS2;LINKAGE=A

Normalized residue in $N\pi \to N(1650) \to \Sigma K$

NODE=B066A01
NODE=B066A01

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.41 ±0.07	−21 ± 24	ROENCHEN	22	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.026	−74	ROENCHEN	15A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1650) \to \Delta\pi$, D-wave

NODE=B066RS3
NODE=B066RS3

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.19±0.06	−30 ± 20	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.23±0.04	−30 ± 20	ANISOVICH	12A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1650) \to N\sigma$

NODE=B066RS4
NODE=B066RS4

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.20±0.15	undefined	SOKHOYAN	15A	DPWA	Multichannel

Normalized residue in $N\pi \to N(1650) \to N(1440)\pi$

NODE=B066RS5
NODE=B066RS5

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.30±0.17	undefined	SOKHOYAN	15A	DPWA	Multichannel

N(1650) BREIT-WIGNER MASS

NODE=B066M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1635 to 1665 (≈ 1650) OUR ESTIMATE				→ UNCHECKED ←
1657 ± 6	GOLOVATCH	19	DPWA	$\gamma p \to \pi^+ \pi^- p$
1666 ± 3	[1] HUNT	19	DPWA	Multichannel
1634 ± 5	KASHEVAROV	17	DPWA	$\gamma p \to \eta p, \eta' p$
1654 ± 6	SOKHOYAN	15A	DPWA	Multichannel
1665 ± 2	[1] SHKLYAR	13	DPWA	Multichannel
1634.7± 1.1	[1] ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
1650 ±30	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
1670 ± 8	HOEHLER	79	IPWA	$\pi N \to \pi N$

NODE=B066M

• • • We do not use the following data for averages, fits, limits, etc. • • •

1651 ± 6		ANISOVICH	12A	DPWA	Multichannel
1664 ± 2	[1]	SHRESTHA	12A	DPWA	Multichannel
1652 ± 9		BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$
1665 ± 2		PENNER	02C	DPWA	Multichannel
1647 ±20		BAI	01B	BES	$J/\psi \to p\bar{p}\eta$
1689 ±12		VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066M;LINKAGE=A

$N(1650)$ BREIT-WIGNER WIDTH

NODE=B066W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
100 to 150 (≈ 125) OUR ESTIMATE				
154 ±28	GOLOVATCH	19	DPWA	$\gamma p \to \pi^+\pi^- p$
133 ± 7	[1] HUNT	19	DPWA	Multichannel
128 ±16	KASHEVAROV	17	DPWA	$\gamma p \to \eta p$, $\eta' p$
102 ± 8	SOKHOYAN	15A	DPWA	Multichannel
147 ±14	[1] SHKLYAR	13	DPWA	Multichannel
115.4± 2.8	[1] ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
150 ±40	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
180 ±20	HOEHLER	79	IPWA	$\pi N \to \pi N$

NODE=B066W

NODE=B066W

→ UNCHECKED ←
OCCUR=2

• • • We do not use the following data for averages, fits, limits, etc. • • •

104 ±10		ANISOVICH	12A	DPWA	Multichannel
126 ± 3	[1]	SHRESTHA	12A	DPWA	Multichannel
202 ±16		BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$
138 ± 7		PENNER	02C	DPWA	Multichannel
145 $^{+80}_{-45}$		BAI	01B	BES	$J/\psi \to p\bar{p}\eta$
202 ±40		VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066W;LINKAGE=A

$N(1650)$ DECAY MODES

NODE=B066225;NODE=B066

The following branching fractions are our estimates, not fits or averages.

NODE=B066

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\pi$	50–70 %	DESIG=1;OUR EST
Γ_2	$N\eta$	15–35 %	DESIG=2;OUR EST
Γ_3	ΛK	5–15 %	DESIG=3;OUR EST
Γ_4	$N\pi\pi$	20–58 %	DESIG=5;OUR EST
Γ_5	$\Delta(1232)\pi$, D-wave	6–18 %	DESIG=6;OUR EST
Γ_6	$N\rho$	12–22 %	DESIG=188;OUR EST
Γ_7	$N\rho$, S=1/2, S-wave	<4 %	DESIG=189;OUR EST
Γ_8	$N\rho$, S=3/2, D-wave	12–18 %	DESIG=190;OUR EST
Γ_9	$N\sigma$	2–18 %	DESIG=9;OUR EST
Γ_{10}	$N(1440)\pi$	6–26 %	DESIG=10;OUR EST
Γ_{11}	$p\gamma$, helicity=1/2	0.04–0.20 %	DESIG=11;OUR EST
Γ_{12}	$n\gamma$, helicity=1/2	0.003–0.17 %	DESIG=12;OUR EST

$N(1650)$ BRANCHING RATIOS

NODE=B066230

$\Gamma(N\pi)/\Gamma_{\text{total}}$ Γ_1/Γ

NODE=B066R1

VALUE (%)	DOCUMENT ID		TECN	COMMENT
50 to 70 (≈ 60) OUR ESTIMATE				
64± 4	[1] HUNT	19	DPWA	Multichannel
51± 4	SOKHOYAN	15A	DPWA	Multichannel
74± 3	[1] SHKLYAR	13	DPWA	Multichannel
65±10	CUTKOSKY	80	IPWA	$\pi N \to \pi N$
61± 4	HOEHLER	79	IPWA	$\pi N \to \pi N$

NODE=B066R1

→ UNCHECKED ←

• • • We do not use the following data for averages, fits, limits, etc. • • •

51± 4	ANISOVICH	12A	DPWA	Multichannel
57± 2	[1] SHRESTHA	12A	DPWA	Multichannel
79± 6	BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$
100	ARNDT	06	DPWA	$\pi N \to \pi N$, ηN
65± 4	PENNER	02C	DPWA	Multichannel
74± 2	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R1;LINKAGE=A

$\Gamma(N\eta)/\Gamma_{total}$ Γ_2/Γ

NODE=B066R13
NODE=B066R13

VALUE (%)	DOCUMENT ID		TECN	COMMENT
15 to 35 (≈ 25) OUR ESTIMATE				
33 ± 4	MUELLER	20	DPWA	Multichannel
0.8± 0.6	[1] HUNT	19	DPWA	Multichannel
28 ±11	[2] KASHEVAROV	17	DPWA	$\gamma p \to \eta p$, $\eta' p$
< 3	SHKLYAR	13	DPWA	Multichannel
18 ± 4	ANISOVICH	12A	DPWA	Multichannel

• • • We do not use the following data for averages, fits, limits, etc. • • •

21 ± 2	[1] SHRESTHA	12A	DPWA	Multichannel
13 ± 5	BATINIC	10	DPWA	$\pi N \to N\pi$, $N\eta$
1.0± 0.6	PENNER	02C	DPWA	Multichannel
6 ± 1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R13;LINKAGE=B

[2] Assuming $A_{1/2} = 0.045$ GeV$^{-1/2}$.

NODE=B066R13;LINKAGE=A

$\Gamma(\Lambda K)/\Gamma_{total}$ Γ_3/Γ

NODE=B066R19
NODE=B066R19

VALUE (%)	DOCUMENT ID		TECN	COMMENT
5 to 15 (≈ 10) OUR ESTIMATE				
3.5±0.2	[1] HUNT	19	DPWA	Multichannel
10 ±5	ANISOVICH	12A	DPWA	Multichannel
4 ±1	[1] SHKLYAR	05	DPWA	Multichannel

• • • We do not use the following data for averages, fits, limits, etc. • • •

8 ±1	[1] SHRESTHA	12A	DPWA	Multichannel
2.7±0.4	PENNER	02C	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R19;LINKAGE=A

$\Gamma(N\pi\pi)/\Gamma_{total}$ Γ_4/Γ

NODE=B066R00
NODE=B066R00

VALUE	DOCUMENT ID		TECN	COMMENT
0.12±0.02	GOLOVATCH	19	DPWA	$\gamma p \to \pi^+ \pi^- p$

$\Gamma(\Delta(1232)\pi, D\text{-wave})/\Gamma_{total}$ Γ_5/Γ

NODE=B066R16
NODE=B066R16

VALUE (%)	DOCUMENT ID		TECN	COMMENT
< 0.2	[1] HUNT	19	DPWA	Multichannel
12 ±6	SOKHOYAN	15A	DPWA	Multichannel

• • • We do not use the following data for averages, fits, limits, etc. • • •

19 ±9	ANISOVICH	12A	DPWA	Multichannel
7 ±2	[1] SHRESTHA	12A	DPWA	Multichannel
2 ±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R16;LINKAGE=A

$\Gamma(N\rho, S{=}1/2, S\text{-wave})/\Gamma_{total}$ Γ_7/Γ

NODE=B066R01
NODE=B066R01

VALUE (%)	DOCUMENT ID		TECN	COMMENT
1.8±1.7	[1] HUNT	19	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R01;LINKAGE=A

$\Gamma(N\rho, S{=}3/2, D\text{-wave})/\Gamma_{total}$ Γ_8/Γ

NODE=B066R02
NODE=B066R02

VALUE (%)	DOCUMENT ID		TECN	COMMENT
15±3	[1] HUNT	19	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R02;LINKAGE=A

$\Gamma(N\sigma)/\Gamma_{total}$ Γ_9/Γ

NODE=B066R17
NODE=B066R17

VALUE (%)	DOCUMENT ID		TECN	COMMENT
12±4	[1] HUNT	19	DPWA	Multichannel
10±8	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 1	[1] SHRESTHA	12A	DPWA	Multichannel
1±1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R17;LINKAGE=A

$\Gamma(N(1440)\pi)/\Gamma_{total}$ Γ_{10}/Γ

NODE=B066R18
NODE=B066R18

VALUE (%)	DOCUMENT ID		TECN	COMMENT
2± 1	[1] HUNT	19	DPWA	Multichannel
16±10	SOKHOYAN	15A	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 1	[1] SHRESTHA	12A	DPWA	Multichannel
3± 1	VRANA	00	DPWA	Multichannel

[1] Statistical error only.

NODE=B066R18;LINKAGE=A

N(1650) PHOTON DECAY AMPLITUDES AT THE POLE

NODE=B066260

N(1650) → pγ, helicity-1/2 amplitude $A_{1/2}$

NODE=B066PA1
NODE=B066PA1

MODULUS ($GeV^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.039±0.005	−0.2 ± 14	ROENCHEN	22	DPWA	Multichannel
0.032±0.006	7 ± 7	ANISOVICH	17D	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.032±0.007	−2 ± 11	ANISOVICH	15A	DPWA	Multichannel
0.059	−14	ROENCHEN	15A	DPWA	Multichannel
0.032±0.006	−2 ± 11	SOKHOYAN	15A	DPWA	Multichannel

N(1650) → nγ, helicity-1/2 amplitude $A_{1/2}$

NODE=B066A00
NODE=B066A00

MODULUS ($GeV^{-1/2}$)	PHASE (°)	DOCUMENT ID		TECN	COMMENT
0.016±0.004	−28 ± 10	ANISOVICH	17D	DPWA	Multichannel
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.019±0.006	0 ± 15	ANISOVICH	15A	DPWA	Multichannel

N(1650) BREIT-WIGNER PHOTON DECAY AMPLITUDES

NODE=B066235

N(1650) → pγ, helicity-1/2 amplitude $A_{1/2}$

NODE=B066A1
NODE=B066A1

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
0.035 to 0.055 (≈ 0.045) OUR ESTIMATE				→ UNCHECKED ←
0.0605±0.0077	GOLOVATCH	19	DPWA	$\gamma p \to \pi^+\pi^- p$
0.048 ±0.003	[1] HUNT	19	DPWA	Multichannel
0.032 ±0.006	SOKHOYAN	15A	DPWA	Multichannel
0.063 ±0.006	[1] SHKLYAR	13	DPWA	Multichannel
0.055 ±0.030	[1] WORKMAN	12A	DPWA	$\gamma N \to N\pi$
0.022 ±0.007	[1] DUGGER	07	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.033 ±0.007	ANISOVICH	12A	DPWA	Multichannel
0.030 ±0.003	[1] SHRESTHA	12A	DPWA	Multichannel
0.033	DRECHSEL	07	DPWA	$\gamma N \to \pi N$
0.049	PENNER	02D	DPWA	Multichannel

[1] Statistical error only.

NODE=B066A1;LINKAGE=A

N(1650) → nγ, helicity-1/2 amplitude $A_{1/2}$

NODE=B066A2
NODE=B066A2

VALUE ($GeV^{-1/2}$)	DOCUMENT ID		TECN	COMMENT
−0.040 to 0.030 (≈ − 0.010) OUR ESTIMATE				→ UNCHECKED ←
0.001±0.006	[1] HUNT	19	DPWA	Multichannel
0.016±0.005	ANISOVICH	17E	DPWA	Multichannel
−0.040±0.010	[1] CHEN	12A	DPWA	$\gamma N \to \pi N$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.025±0.020	ANISOVICH	13B	DPWA	Multichannel
0.011±0.002	[1] SHRESTHA	12A	DPWA	Multichannel
0.009	DRECHSEL	07	DPWA	$\gamma N \to \pi N$
−0.011	PENNER	02D	DPWA	Multichannel

[1] Statistical error only.

NODE=B066A2;LINKAGE=A

N(1650) REFERENCES

NODE=B066

For early references, see Physics Letters **111B** 1 (1982).

NODE=B066

ROENCHEN	22	EPJ A58 229	D. Roenchen *et al.*	(JULI, GWU, BONN+)		REFID=61999
AFZAL	20	PRL 125 152002	F. Afzal *et al.*	(CBELSA/TAPS Collab.)		REFID=60951
MUELLER	20	PL B803 135323	J. Mueller *et al.*	(CBELSA/TAPS Collab.)		REFID=60391
GOLOVATCH	19	PL B788 371	E. Golovatch *et al.*	(CLAS Collab.)		REFID=59418
HUNT	19	PR C99 055205	B.C. Hunt, D.M. Manley			REFID=59985
ANISOVICH	17A	PRL 119 062004	A.V. Anisovich *et al.*			REFID=57949
ANISOVICH	17D	PR C95 035211	A.V. Anisovich *et al.*			REFID=58177
ANISOVICH	17E	PR C96 055202	A.V. Anisovich *et al.*	(BONN, PNPI, JLAB+)		REFID=62311
KASHEVAROV	17	PRL 118 212001	V.L. Kashevarov *et al.*	(A2/MAMI Collab.)		REFID=57930
ANISOVICH	15A	EPJ A51 72	A.V. Anisovich *et al.*			REFID=58175
ROENCHEN	15A	EPJ A51 70	D. Roenchen *et al.*			REFID=58183
SOKHOYAN	15A	EPJ A51 95	V. Sokhoyan *et al.*	(CBELSA/TAPS Collab.)		REFID=56757
PDG	14	CP C38 070001	K. Olive *et al.*	(PDG Collab.)		REFID=55687
SVARC	14	PR C89 045205	A. Svarc *et al.*	(RBI Zagreb, UNI Tuzla)		REFID=55775
ANISOVICH	13B	EPJ A49 67	A.V. Anisovich *et al.*			REFID=56147
SHKLYAR	13	PR C87 015201	V. Shklyar, H. Lenske, U. Mosel	(GIES)		REFID=55104
ANISOVICH	12A	EPJ A48 15	A.V. Anisovich *et al.*	(BONN, PNPI)		REFID=54041
CHEN	12A	PR C86 015206	W. Chen *et al.*	(DUKE, GWU, MSST, ITEP+)		REFID=54337
SHRESTHA	12A	PR C86 055203	M. Shrestha, D.M. Manley	(KSU)		REFID=54862
WORKMAN	12A	PR C86 015202	R. Workman *et al.*	(GWU)		REFID=54335
BATINIC	10	PR C82 038203	M. Batinic *et al.*	(ZAGR)		REFID=53552
DRECHSEL	07	EPJ A34 69	D. Drechsel, S.S. Kamalov, L. Tiator	(MAINZ, JINR)		REFID=52105
DUGGER	07	PR C76 025211	M. Dugger *et al.*	(JLab CLAS Collab.)		REFID=52039
ARNDT	06	PR C74 045205	R.A. Arndt *et al.*	(GWU)		REFID=51535
SHKLYAR	05	PR C72 015210	V. Shklyar, H. Lenske, U. Mosel	(GIES)		REFID=50977
PENNER	02C	PR C66 055211	G. Penner, U. Mosel	(GIES)		REFID=49129
PENNER	02D	PR C66 055212	G. Penner, U. Mosel	(GIES)		REFID=49130
BAI	01B	PL B510 75	J.Z. Bai *et al.*	(BES Collab.)		REFID=48266
VRANA	00	PRPL 328 181	T.P. Vrana, S.A. Dytman, T.-S.H. Lee	(PITT, ANL)		REFID=47593
HOEHLER	93	πN Newsletter 9 1	G. Hohler	(KARL)		REFID=43821
CUTKOSKY	80	Toronto Conf. 19	R.E. Cutkosky *et al.*	(CMU, LBL)	IJP	REFID=30064
Also		PR D20 2839	R.E. Cutkosky *et al.*	(CMU, LBL)	IJP	REFID=40096
HOEHLER	79	PDAT 12-1	G. Hohler *et al.*	(KARLT)	IJP	REFID=30058
Also		Toronto Conf. 3	R. Koch	(KARLT)	IJP	REFID=30859