NODE=B095

$Z_0(1780)$ $1/2^+$

$I(J^P) = 0(\frac{1}{2}^+)$ Status: *

OMITTED FROM SUMMARY TABLE

WILSON 72, GIACOMELLI 74, and NAKAJIMA 82B find some solutions with resonant-like behavior in the P_{01} partial wave. The effect seen in the isospin-0 total cross section, if a resonance, must have spin 1/2, because the inelastic cross section is very small and the total cross section is about $4\pi/k^2$. NODE=B095

$Z_0(1780)$ MASS

NODE=B095M

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
1778	NAKAJIMA	82B	PWA		$K N$ 0.2–1.6 GeV/c
1740	GIACOMELLI	74	PWA	0	0.38–1.51 GeV/c
1750	[1] CARROLL	73B	CNTR		Isospin-0 σ_{total} fit 1
1825	[1] CARROLL	73B	CNTR		$K N$ $I = 0$ total σ (fit 2)
1800	[2] WILSON	72	PWA		$K^+ N$ P_{01} wave
1780±10	COOL	70B	CNTR	+	$K^+ p$, $K^+ d$ total σ
seen	[3] DOWELL	70	CNTR		$K^+ p$, d total

NODE=B095M

OCCUR=2

$Z_0(1780)$ WIDTH

NODE=B095W

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
662	NAKAJIMA	82B	PWA		$K N$ 0.2–1.6 GeV/c
300	GIACOMELLI	74	PWA		0.38–1.51 GeV/c
600	[1] CARROLL	73B	CNTR		Isospin-0 σ_{total} fit 1
845	[1] CARROLL	73B	CNTR		$K N$ $I = 0$ total σ (fit 2)
300	[2] WILSON	72	PWA		$K^+ N$ P_{01} wave
565	COOL	70B	CNTR	+	$K^+ p$, $K^+ d$ total σ

NODE=B095W

OCCUR=2

$Z_0(1780)$ DECAY MODES

NODE=B095215;NODE=B095

	Mode
Γ_1	$N K$

DESIG=1

$Z_0(1780)$ BRANCHING RATIOS

NODE=B095220

$\Gamma(NK)/\Gamma_{total}$					Γ_1/Γ
VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.56	NAKAJIMA	82B	PWA		$K N$ 0.2–1.6 GeV/c
0.85	GIACOMELLI	74	PWA		0.38–1.51 GeV/c
0.75	[1] CARROLL	73B	CNTR		If $J = 1/2$, fit 1
0.91	[1] CARROLL	73B	CNTR		If $J = 1/2$, fit 2
0.85	[2] WILSON	72	PWA		$K^+ N$ P_{01} wave
0.95	COOL	70B	CNTR	+	$K^+ p$, $K^+ d$ total σ

NODE=B095R1
NODE=B095R1

OCCUR=2

$Z_0(1780)$ FOOTNOTES

NODE=B095

[1] NODE=B095;LINKAGE=C

Fit1 = fit of single L = 1 Breit-Wigner + background to $I = 0$ total cross section from 0.4–1.1 GeV/c.
Fit2 = fit of L = 1 and L = 2 Breit-Wigners to same data; see $Z_0(1865)$ for L = 2 part.

[2] Estimate of parameters from Breit-Wigner + quadratic background fit to P_{01}. NODE=B095;LINKAGE=B

[3] See also discussion of LYNCH 70. NODE=B095;LINKAGE=A

$Z_0(1780)$ REFERENCES

NODE=B095

See our 1982 edition Physics Letters **111B** 1 (1982) for a number of other references to experimental work in this region.

NODE=B095

NAKAJIMA	82B	PL 112B 80	K. Nakajima *et al.*	(KEK) IJP	REFID=31534
GIACOMELLI	74	NP B71 138	G. Giacomelli *et al.*	(BGNA, GLAS, ROMA+) IJP	REFID=31533
CARROLL	73B	PL 45B 531	A.S. Carroll *et al.*	(BNL) I	REFID=31532
WILSON	72	NP B42 445	B.C. Wilson *et al.*	(BGNA, GLAS, ROMA+)	REFID=31531
COOL	70B	Duke Conf. 47	R.L. Cool	(BNL)	REFID=31527
Hyperon Resonances, 1970					
Also		PL 30B 564	R.J. Abrams *et al.*	(BNL)	REFID=31528
Also		PR D1 1887	R.L. Cool *et al.*	(BNL)	REFID=31529
DOWELL	70	Duke Conf. 53	J.D. Dowell	(BIRM)	REFID=31530
Hyperon Resonances 1970					
LYNCH	70	Duke Conf. 9	G.R. Lynch	(LRL)	REFID=31535
Reviewer.					

OTHER RELATED PAPERS

CORDEN	82	PR D25 720	M.J. Corden *et al.*	(BIRM, CURIN)	REFID=31544
NAKAJIMA	82	PL 112B 75	K. Nakajima *et al.*	(KEK)	REFID=31559
OADES	81	Rome Conf. 53	G.C. Oades	(AARH)	REFID=31543
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MARTIN	80	Toronto Conf. 355	B.R. Martin, G.C. Oades	(LOUC, AARH)	REFID=31542
ROBERTSON	80	PL 91B 465	A.W. Robertson *et al.*	(RHEL, LOQM)	REFID=31565
WATTS	80	PL 95B 323	S.J. Watts *et al.*	(LOQM, RHEL)	REFID=31566
CORDEN	79B	NP B155 13	M.J. Corden *et al.*	(BIRM, CURIN)	REFID=31558
ROIESNEL	79	PR D20 1646	C. Roiesnel	(MIT)	REFID=31541
CAMERON	78C	NP B132 189	W. Cameron *et al.*	(BGNA, EDIN, GLAS+)	REFID=31555
ENGLER	78	PR D18 3061	A. Engler *et al.*	(CMU, ANL)	REFID=31556
Also		PL 60B 293	Y. Cho *et al.*	(ANL, CMU)	REFID=31557
ARMITAGE	77	NP B123 11	J.C.M. Armitage *et al.*	(MCHS, DARE)	REFID=31562
GLASSER	77	PR D15 1200	R.G. Glasser *et al.*	(UMD, IIT)	REFID=31563
SAKITT	77	PR D15 1846	M. Sakitt, J. Skelly, J. Thompson	(BNL)	REFID=31564
BIGI	76	NP B110 25	A. Bigi *et al.*	(BGNA, EDIN, GLAS, PISA+) IJP	REFID=31540
EDELSTEIN	76	PR D14 702	R.M. Edelstein *et al.*	(CMU, IOWA, ANL)	REFID=31561
ADAMS	75	NP B87 41	U. Adams *et al.*	(WASH)	REFID=31552
ALEXANDER	75B	PL 58B 484	G. Alexander *et al.*	(TELA, HEIDH) IJP	REFID=31553
CAMERON	75	Palermo Conf.	W. Cameron *et al.*	(BGNA, EDIN, GLAS+) IJP	REFID=31539
DAMERELL	75	NP B94 374	C.J.S. Damerell *et al.*	(RHEL, BIRM)	REFID=31554
JOHNSON	74	PL 50B 343	R.C. Johnson, S.D.P. Vlassopulos	(CERN, DURH)	REFID=31538
LONDON	74	PR D9 1569	G.W. London	(BNL) IJP	REFID=31551
BOWEN	73B	PR D7 22	T. Bowen *et al.*	(ARIZ, MICH)	REFID=31537
GIACOMELLI	73	NP B56 346	G. Giacomelli *et al.*	(BGNA, GLAS, ROMA+)	REFID=31549
Also		BGNA PPT. AE-73/4	G. Giacomelli *et al.*	(BGNA, GLAS, ROMA+)	REFID=31550
ARMITAGE	72	NAL Paper 391	J.C.M. Armitage *et al.*	(MCHS, DARE)	REFID=31547
GIACOMELLI	72	NP B37 577	G. Giacomelli *et al.*	(BGNA, GLAS, ROMA+)	REFID=31560
GIACOMELLI	72B	NP B42 437	G. Giacomelli *et al.*	(BGNA, GLAS, ROMA+)	REFID=31548
HIRATA	71	NP B30 157	A.A. Hirata *et al.*	(LBL) IJP	REFID=31536
RAY	69	PR 183 1183	A.K. Ray *et al.*	(CMU, BNL)	REFID=31546
GOLDHABER	62	PRL 9 135	S. Goldhaber *et al.*	(LRL, UCLA) IJP	REFID=31545