NODE=M036

$a_0(980)$

$I^G(J^{PC}) = 1^-(0^{++})$

See the related review(s):
Scalar Mesons below 1 GeV

$a_0(980)$ T-MATRIX POLE $\sqrt{s}$

NODE=M036PP

Note that $\Gamma = -2\ \mathrm{Im}(\sqrt{s})$.

NODE=M036PP

NODE=M036PP

→ UNCHECKED ←

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
(970–1020) − i (30–70) OUR ESTIMATE (see Fig. 64.2 in the review)				
$(1002.4 \pm 1.4 \pm 6.6) - i(63.5 \pm 2.9)$	[1] ALBRECHT	20	CBAR	0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0 K^+K^-$
$(1000.7^{+12.9}_{-0.7}) - i(36.6^{+12.7}_{-2.6})$	[2] LU	20	RVUE	$\gamma\gamma \to \pi^0\eta$, $K^0_S K^0_S$
$(989 \pm 5) - i(40 \pm 5)$	[3] BUGG	08A	RVUE	$\overline{p}p$ annihilation data
$(1117^{+24}_{-320}) - i(12^{+43}_{-12})$	[4] PELAEZ	04A	RVUE	$\pi\pi \to \pi\pi$, $\pi K \to \pi K$
$(982 \pm 3) - i(46 \pm 4)$	[5] ABELE	98	CBAR	0.0 $\overline{p}p \to K^0_L K^\pm\pi^\mp$

[1] Pole mass on sheet closest to the physical axis - the more remote pole is extracted at $(1004.1 \pm 1.5 \pm 6.5) - i(48.6 \pm 1.2 \pm 3.4)$ MeV. NODE=M036PP;LINKAGE=E

[2] T-matrix pole on sheet II. NODE=M036PP;LINKAGE=LU

[3] T-matrix pole on sheet II. Parameterizes couplings to $\overline{K}K$, $\pi\eta$, and $\pi\eta'$. Uses AMSLER 94D and ABELE 98. NODE=M036PP;LINKAGE=C

[4] Reanalysis of data from LINGLIN 73, ESTABROOKS 78, and ASTON 88 in the unitarized ChPT model. NODE=M036PP;LINKAGE=A

[5] T-matrix pole on sheet II; the pole on sheet III is at $(1006 - i\ 49)$ MeV. NODE=M036PP;LINKAGE=D

$a_0(980)$ MASS

NODE=M036205

NODE=M036MX

→ UNCHECKED ←

VALUE (MeV)	*DOCUMENT ID*
980±20 OUR ESTIMATE	Mass determination very model dependent

$\eta\pi$ FINAL STATE ONLY

NODE=M036M1

NODE=M036M1

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$982.5 \pm 1.6 \pm 1.1$	16.9k	[1] AMBROSINO	09F	KLOE		1.02 $e^+e^- \to \eta\pi^0\gamma$
986 ± 4		ANISOVICH	09	RVUE		0.0 $\overline{p}p$, πN
$982.3 ^{+0.6}_{-0.7} {}^{+3.1}_{-4.7}$		[2] UEHARA	09A	BELL		$\gamma\gamma \to \pi^0\eta$
$985 \pm 4 \pm 6$	318	ACHARD	02B	L3		183–209 $e^+e^- \to e^+e^-\eta\pi^+\pi^-$
$995 ^{+52}_{-10}$	36	[3] ACHASOV	00F	SND		$e^+e^- \to \eta\pi^0\gamma$
$994 ^{+33}_{-8}$	36	[4] ACHASOV	00F	SND		$e^+e^- \to \eta\pi^0\gamma$ OCCUR=2
975 ± 7		BARBERIS	00H			450 $pp \to p_f \eta\pi^0 p_s$
988 ± 8		BARBERIS	00H			450 $pp \to \Delta^{++}_f \eta\pi^- p_s$ OCCUR=2
~ 1055		[5] OLLER	99	RVUE		$\eta\pi$, $K\overline{K}$
~ 1009.2		[5] OLLER	99B	RVUE		$\pi\pi \to \pi\pi$, $K\overline{K}$
993.1 ± 2.1		[6] TEIGE	99	B852		18.3 $\pi^-p \to \eta\pi^+\pi^-n$
988 ± 6		[5] ANISOVICH	98B	RVUE		Compilation
987		TORNQVIST	96	RVUE		$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
991		JANSSEN	95	RVUE		$\eta\pi \to \eta\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$
$984.45 \pm 1.23 \pm 0.34$		AMSLER	94C	CBAR		0.0 $\overline{p}p \to \omega\eta\pi^0$
982 ± 2		[7] AMSLER	92	CBAR		0.0 $\overline{p}p \to \eta\eta\pi^0$
984 ± 4	1040	[7] ARMSTRONG	91B	OMEG	±	300 $pp \to pp\eta\pi^+\pi^-$
976 ± 6		ATKINSON	84E	OMEG	±	25–55 $\gamma p \to \eta\pi n$
986 ± 3	500	[8] EVANGELIS...	81	OMEG	±	12 $\pi^-p \to \eta\pi^+\pi^-\pi^-p$
990 ± 7	145	[8] GURTU	79	HBC	±	4.2 $K^-p \to \Lambda\eta 2\pi$
980 ± 11	47	CONFORTO	78	OSPK	−	4.5 $\pi^-p \to pX^-$
978 ± 16	50	CORDEN	78	OMEG	±	12–15 $\pi^-p \to n\eta 2\pi$
977 ± 7		GRASSLER	77	HBC	−	16 $\pi^\mp p \to p\eta 3\pi$

989	± 4	70	WELLS	75	HBC	−	3.1–6 $K^- p \to \Lambda\eta 2\pi$	OCCUR=2
972	±10	150	DEFOIX	72	HBC	±	0.7 $\overline{p}p \to 7\pi$	
970	±15	20	BARNES	69C	HBC	−	4–5 $K^- p \to \Lambda\eta 2\pi$	
980	±10		CAMPBELL	69	DBC	±	2.7 $\pi^+ d$	
980	±10	15	MILLER	69B	HBC	−	4.5 $K^- N \to \eta\pi\Lambda$	
980	±10	30	AMMAR	68	HBC	±	5.5 $K^- p \to \Lambda\eta 2\pi$	

[1] Using the model of ACHASOV 89 and ACHASOV 03B. NODE=M036M1;LINKAGE=AM
[2] From a fit with the S-wave amplitude including two interfering Breit-Wigners plus a background term. NODE=M036M1;LINKAGE=UE
[3] Using the model of ACHASOV 89. Supersedes ACHASOV 98B. NODE=M036M1;LINKAGE=V1
[4] Using the model of JAFFE 77. Supersedes ACHASOV 98B. NODE=M036M1;LINKAGE=M2
[5] T-matrix pole. NODE=M036M1;LINKAGE=AN
[6] Breit-Wigner fit, average between $a_0^{\pm}$ and a_0^0. The fit favors a slightly heavier $a_0^{\pm}$. NODE=M036M1;LINKAGE=BF
[7] From a single Breit-Wigner fit. NODE=M036M1;LINKAGE=A
[8] From $f_1(1285)$ decay. NODE=M036M1;LINKAGE=R

$K\overline{K}$ ONLY

NODE=M036M2
NODE=M036M2

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$947.7^{+5.5}_{-5.0} \pm 6.6$		[1] AAIJ	19H	LHCB	$pp \to D^{\pm} X$
925 ± 5 ±8	190k	[2] AAIJ	16N	LHCB	$D^0 \to K^0_S K^{\pm}\pi^{\mp}$
∼ 1053		[3] OLLER	99C	RVUE	$\pi\pi \to \pi\pi$, $K\overline{K}$
975 ±15		BERTIN	98B	OBLX	0.0 $\overline{p}p \to K^{\pm} K_S \pi^{\mp}$
970 ±10	316	DEBILLY	80	HBC	1.2–2 $\overline{p}p \to f_1(1285)\omega$
1016 ±10	100	[4] ASTIER	67	HBC	0.0 $\overline{p}p$
1003.3± 7.0	143	[5,6] ROSENFELD	65	RVUE	

[1] From the $D^{\pm} \to K^{\pm} K^+ K^-$ Dalitz plot fit with the Triple-M amplitude in the multi-meson model of AOUDE 18. NODE=M036M2;LINKAGE=C
[2] Using a two-channel resonance parametrization with couplings fixed to ABELE 98. NODE=M036M2;LINKAGE=B
[3] T-matrix pole. NODE=M036M2;LINKAGE=AN
[4] ASTIER 67 includes data of BARLOW 67, CONFORTO 67, ARMENTEROS 65. NODE=M036M2;LINKAGE=A
[5] Note on J^P. Main argument for 0^+ is small Q value. Isotropy of decay distribution in $\overline{p}p$ at rest proves nothing. See discussion by Rosenfeld (Oxford) and Butterworth (Heidelberg). NODE=M036M2;LINKAGE=01
[6] Plus systematic errors. NODE=M036M2;LINKAGE=S

$a_0(980)$ WIDTH

NODE=M036210

NODE=M036W1

→ UNCHECKED ←

50 to 100 OUR ESTIMATE Width determination very model dependent. Peak width in $\eta\pi$ is about 60 MeV, but decay width can be much larger.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •							
75.6 ± 1.6 $^{+17.4}_{-10.0}$		[1] UEHARA	09A	BELL		$\gamma\gamma \to \pi^0\eta$	
50 ±13 ± 4	318	ACHARD	02B	L3		183–209 $e^+e^- \to e^+e^-\eta\pi^+\pi^-$	
72 ±16		BARBERIS	00H			450 $pp \to p_f \eta\pi^0 p_s$	
61 ±19		BARBERIS	00H			450 $pp \to \Delta_f^{++}\eta\pi^- p_s$	OCCUR=2
∼ 42		[2] OLLER	99	RVUE		$\eta\pi$, $K\overline{K}$	
∼ 112		[2] OLLER	99B	RVUE		$\pi\pi \to \eta\pi$, $K\overline{K}$	
71 ± 7		TEIGE	99	B852		18.3 $\pi^- p \to \eta\pi^+\pi^- n$	
92 ±20		[2] ANISOVICH	98B	RVUE		Compilation	
65 ±10		[3] BERTIN	98B	OBLX	±	0.0 $\overline{p}p \to K^{\pm} K_S \pi^{\mp}$	
∼ 100		TORNQVIST	96	RVUE		$\pi\pi \to \pi\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$	
202		JANSSEN	95	RVUE		$\eta\pi \to \eta\pi$, $K\overline{K}$, $K\pi$, $\eta\pi$	
54.12± 0.34± 0.12		AMSLER	94C	CBAR		0.0 $\overline{p}p \to \omega\eta\pi^0$	
54 ±10		[4] AMSLER	92	CBAR		0.0 $\overline{p}p \to \eta\eta\pi^0$	
95 ±14	1040	[4] ARMSTRONG	91B	OMEG	±	300 $pp \to pp\eta\pi^+\pi^-$	
62 ±15	500	[5] EVANGELIS...	81	OMEG	±	12 $\pi^- p \to \eta\pi^+\pi^-\pi^- p$	

60	±20	145	[5] GURTU	79	HBC	±	4.2 $K^- p \to \Lambda \eta 2\pi$
60	$^{+50}_{-30}$	47	CONFORTO	78	OSPK	−	4.5 $\pi^- p \to p X^-$
86.0	$^{+60.0}_{-50.0}$	50	CORDEN	78	OMEG	±	12–15 $\pi^- p \to n \eta 2\pi$
44	±22		GRASSLER	77	HBC	−	16 $\pi^\mp p \to p \eta 3\pi$
80	to 300		[6] FLATTE	76	RVUE	−	4.2 $K^- p \to \Lambda \eta 2\pi$
16.0	$^{+25.0}_{-16.0}$	70	[7] WELLS	75	HBC	−	3.1–6 $K^- p \to \Lambda \eta 2\pi$
30	± 5	150	[8] DEFOIX	72	HBC	±	0.7 $\overline{p} p \to 7\pi$
40	±15		CAMPBELL	69	DBC	±	2.7 $\pi^+ d$
60	±30	15	MILLER	69B	HBC	−	4.5 $K^- N \to \eta \pi \Lambda$
80	±30	30	AMMAR	68	HBC	±	5.5 $K^- p \to \Lambda \eta 2\pi$

[1] From a fit with the S-wave amplitude including two interfering Breit-Wigners plus a background term. NODE=M036W1;LINKAGE=UE
[2] T-matrix pole. NODE=M036W1;LINKAGE=AN
[3] The $\eta \pi$ width. NODE=M036W1;LINKAGE=BE
[4] From a single Breit-Wigner fit. NODE=M036W1;LINKAGE=A
[5] From $f_1(1285)$ decay. NODE=M036W1;LINKAGE=R
[6] Using a two-channel resonance parametrization of GAY 76B data. NODE=M036W1;LINKAGE=F
[7] Weak evidence only for $a_0(980)^+$ production. NODE=M036W1;LINKAGE=W
[8] This number has very little meaning. Error is much too small. Vlada NODE=M036W1;LINKAGE=01

$K\overline{K}$ ONLY

NODE=M036W2
NODE=M036W2

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •						
∼ 48		[1] OLLER	99C	RVUE		$\pi\pi \to \pi\pi$, $K\overline{K}$
∼ 25	100	[2] ASTIER	67	HBC	±	
57±13	143	[3] ROSENFELD	65	RVUE	±	

[1] T-matrix pole. NODE=M036W2;LINKAGE=AN
[2] ASTIER 67 includes data of BARLOW 67, CONFORTO 67, ARMENTEROS 65. NODE=M036W2;LINKAGE=A
[3] Plus systematic errors. NODE=M036W2;LINKAGE=S

$a_0(980)$ DECAY MODES

NODE=M036215;NODE=M036

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$\eta\pi$	seen	DESIG=1;OUR EST;→ UNCHECKED ←
Γ_2	$K\overline{K}$	seen	DESIG=3;OUR EST;→ UNCHECKED ←
Γ_3	$\eta'\pi$	seen	DESIG=8
Γ_4	$\rho\pi$	not seen	DESIG=2;OUR EST;→ UNCHECKED ←
Γ_5	$\gamma\gamma$	seen	DESIG=5;OUR EST;→ UNCHECKED ←
Γ_6	$e^+ e^-$		DESIG=6

$a_0(980)$ PARTIAL WIDTHS

NODE=M036217

$\Gamma(\gamma\gamma)$ Γ_5

NODE=M036W4
NODE=M036W4

VALUE (keV)	*DOCUMENT ID*		*TECN*
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.30±0.10	[1] AMSLER	98	RVUE

[1] Using $\Gamma_{\gamma\gamma} B(a0(980) \to \eta\pi) = 0.24 \pm 0.08$ keV. NODE=M036W4;LINKAGE=A

$a_0(980)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

NODE=M036220

$\Gamma(\eta\pi) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}}$ $\Gamma_1\Gamma_5/\Gamma$

NODE=M036G1
NODE=M036G1

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
0.21 $^{+0.08}_{-0.04}$ OUR AVERAGE					
0.128 $^{+0.003}_{-0.002}$ $^{+0.502}_{-0.043}$		[1] UEHARA	09A	BELL	$\gamma\gamma \to \pi^0 \eta$
0.28 ±0.04 ±0.10	44	OEST	90	JADE	$e^+ e^- \to e^+ e^- \pi^0 \eta$
0.19 ±0.07 $^{+0.10}_{-0.07}$		ANTREASYAN	86	CBAL	$e^+ e^- \to e^+ e^- \pi^0 \eta$

[1] From a fit with the S-wave amplitude including two interfering Breit-Wigners plus a background term. NODE=M036G1;LINKAGE=UE

$\Gamma(\eta\pi) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_1\Gamma_6/\Gamma$

NODE=M036G2
NODE=M036G2

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<1.5	90	VOROBYEV	88	ND	$e^+e^- \to \pi^0\eta$

$a_0(980)$ BRANCHING RATIOS

NODE=M036225

$\Gamma(K\overline{K})/\Gamma(\eta\pi)$ — Γ_2/Γ_1

NODE=M036R2
NODE=M036R2

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.172±0.019 OUR AVERAGE					
0.137±0.036±0.042	[1] ABLIKIM	22AH	BES3		$D_s^+ \to K_S^0 K^+ \pi^0$
0.23 ±0.05	[2] ABELE	98	CBAR		0.0 $\overline{p}p \to K_L^0 K^\pm \pi^\mp$
0.166±0.01 ±0.02	[3] BARBERIS	98C	OMEG		450 $pp \to p_f f_1(1285) p_s$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.138±0.001±0.035	[4] ALBRECHT	20	CBAR		0.9 $\overline{p}p \to \pi^0\pi^0\eta$, $\pi^0\eta\eta$, $\pi^0 K^+ K^-$
1.20 ±0.15	[5] ANISOVICH	09	RVUE		0.0 $\overline{p}p$, πN
1.05 ±0.07 ±0.05	[6] BUGG	08A	RVUE	0	$\overline{p}p \to \pi^0\pi^0\eta$
0.57 ±0.16	[7] BARGIOTTI	03	OBLX		$\overline{p}p$
∼ 0.60	OLLER	99B	RVUE		$\pi\pi \to \eta\pi$, $K\overline{K}$
0.7 ±0.3	[3] CORDEN	78	OMEG		12–15 $\pi^- p \to n\eta 2\pi$
0.25 ±0.08	[3] DEFOIX	72	HBC	±	0.7 $\overline{p} \to 7\pi$

[1] Using $D_s^+ \to a_0(980)^+\pi^0$ from ABLIKIM 19BE. NODE=M036R2;LINKAGE=B
[2] Using $\pi^0\pi^0\eta$ from AMSLER 94D. NODE=M036R2;LINKAGE=Q
[3] From the decay of $f_1(1285)$. NODE=M036R2;LINKAGE=L
[4] Residues from T-matrix pole with 2 poles, 2 channels. Solution on adjacent sheet 0.149 ± 0.001 ± 0.039. NODE=M036R2;LINKAGE=A
[5] This is a ratio of couplings. NODE=M036R2;LINKAGE=AN
[6] A ratio of couplings, using AMSLER 94D and ABELE 98. Supersedes BUGG 94. NODE=M036R2;LINKAGE=BU
[7] Coupled channel analysis of $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, and $K^\pm K_S^0\pi^\mp$. NODE=M036R;LINKAGE=BG

$\Gamma(\eta'\pi)/\Gamma_{total}$ — Γ_3/Γ

NODE=M036R00
NODE=M036R00

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen	116k	[1] CHEN	20A	BELL	$D^0 \to K^-\pi^+\eta$

[1] From an amplitude analysis of the $D^0 \to K^-\pi^+\eta$ decay in a three-channel Flatte model with a 10.1 σ significance. Earlier observed by ABLIKIM 17K in the $\chi_{c1} \to \eta\pi^+\pi^-$ decay with a 8.9 σ significance. NODE=M036R00;LINKAGE=A

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

NODE=M036R1

$\rho\pi$ forbidden.

NODE=M036R1
NODE=M036R1

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.25	70	[1] AMMAR	70	HBC	±	4.1,5.5 $K^- p \to \Lambda\eta 2\pi$

[1] Not clear if they really observed the $a_0(980)$ 3 standard deviations. NODE=M036R1;LINKAGE=01

$a_0(980)$ REFERENCES

NODE=M036

ABLIKIM	22AH	PRL 129 182001	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61880
ALBRECHT	20	EPJ C80 453	M. Albrecht *et al.*	(Crystal Barrel Collab.)	REFID=60439
CHEN	20A	PR D102 012002	Y.Q. Chen *et al.*	(BELLE Collab.)	REFID=60333
LU	20	EPJ C80 436	J. Lu, B. Moussallam		REFID=60436
AAIJ	19H	JHEP 1904 063	R. Aaij *et al.*	(LHCb Collab.)	REFID=59670
ABLIKIM	19BE	PRL 123 112001	M. Ablikim *et al.*	(BESIII Collab.)	REFID=60055
AOUDE	18	PR D98 056021	R.T. Aoude *et al.*		REFID=59987
ABLIKIM	17K	PR D95 032002	M. Ablikim *et al.*	(BESIII Collab.)	REFID=57953
AAIJ	16N	PR D93 052018	R. Aaij *et al.*	(LHCb Collab.)	REFID=57273
AMBROSINO	09F	PL B681 5	F. Ambrosino *et al.*	(KLOE Collab.)	REFID=53105
ANISOVICH	09	IJMP A24 2481	V.V. Anisovich, A.V. Sarantsev	(PNPI)	REFID=52719
UEHARA	09A	PR D80 032001	S. Uehara *et al.*	(BELLE Collab.)	REFID=53002
BUGG	08A	PR D78 074023	D.V. Bugg	(LOQM)	REFID=52578
PELAEZ	04A	MPL A19 2879	J.R. Pelaez	(MADU)	REFID=50347
ACHASOV	03B	PR D68 014006	N.N. Achsaov, A.V. Kiselev		REFID=49476
BARGIOTTI	03	EPJ C26 371	M. Bargiotti *et al.*	(OBELIX Collab.)	REFID=49217
ACHARD	02B	PL B526 269	P. Achard *et al.*	(L3 Collab.)	REFID=48574
ACHASOV	00F	PL B479 53	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=47928
BARBERIS	00H	PL B488 225	D. Barberis *et al.*	(WA 102 Collab.)	REFID=47964
OLLER	99	PR D60 099906 (errat.)	J.A. Oller *et al.*		REFID=46899
OLLER	99B	NP A652 407 (errat.)	J.A. Oller, E. Oset		REFID=46924
OLLER	99C	PR D60 074023	J.A. Oller, E. Oset		REFID=47386
TEIGE	99	PR D59 012001	S. Teige *et al.*	(BNL E852 Collab.)	REFID=46613
ABELE	98	PR D57 3860	A. Abele *et al.*	(Crystal Barrel Collab.)	REFID=45863
ACHASOV	98B	PL B438 441	M.N. Achasov *et al.*	(Novosibirsk SND Collab.)	REFID=46317
AMSLER	98	RMP 70 1293	C. Amsler		REFID=46601
ANISOVICH	98B	SPU 41 419	V.V. Anisovich *et al.*		REFID=46331
		Translated from UFN 168 481.			

BARBERIS	98C	PL B440 225	D. Barberis *et al.*	(WA 102 Collab.)	REFID=46346
BERTIN	98B	PL B434 180	A. Bertin *et al.*	(OBELIX Collab.)	REFID=46351
TORNQVIST	96	PRL 76 1575	N.A. Tornqvist, M. Roos	(HELS)	REFID=44507
JANSSEN	95	PR D52 2690	G. Janssen *et al.*	(STON, ADLD, JULI)	REFID=44508
AMSLER	94C	PL B327 425	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44091
AMSLER	94D	PL B333 277	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=44093
BUGG	94	PR D50 4412	D.V. Bugg *et al.*	(LOQM)	REFID=44078
AMSLER	92	PL B291 347	C. Amsler *et al.*	(Crystal Barrel Collab.)	REFID=43169
ARMSTRONG	91B	ZPHY C52 389	T.A. Armstrong *et al.*	(ATHU, BARI, BIRM+)	REFID=41862
OEST	90	ZPHY C47 343	T. Oest *et al.*	(JADE Collab.)	REFID=41358
ACHASOV	89	NP B315 465	N.N. Achasov, V.N. Ivanchenko		REFID=48021
ASTON	88	NP B296 493	D. Aston *et al.*	(SLAC, NAGO, CINC, INUS)	REFID=40262
VOROBYEV	88	SJNP 48 273	P.V. Vorobiev *et al.*	(NOVO)	REFID=41023
		Translated from YAF 48 436.			
ANTREASYAN	86	PR D33 1847	D. Antreasyan *et al.*	(Crystal Ball Collab.)	REFID=20469
ATKINSON	84E	PL 138B 459	M. Atkinson *et al.*	(BONN, CERN, GLAS+)	REFID=20624
EVANGELIS...	81	NP B178 197	C. Evangelista *et al.*	(BARI, BONN, CERN+)	REFID=20462
DEBILLY	80	NP B176 1	L. de Billy *et al.*	(CURIN, LAUS, NEUC+)	REFID=20461
GURTU	79	NP B151 181	A. Gurtu *et al.*	(CERN, ZEEM, NIJM, OXF)	REFID=20456
CONFORTO	78	LNC 23 419	B. Conforto *et al.*	(RHEL, TNTO, CHIC+)	REFID=20451
CORDEN	78	NP B144 253	M.J. Corden *et al.*	(BIRM, RHEL, TELA+)	REFID=20452
ESTABROOKS	78	NP B133 490	P.G. Estabrooks *et al.*	(MCGI, CARL, DURH+)	REFID=22443
GRASSLER	77	NP B121 189	H. Grassler *et al.*	(AACH3, BERL, BONN+)	REFID=20447
JAFFE	77	PR D15 267,281	R. Jaffe	(MIT)	REFID=43673
FLATTE	76	PL 63B 224	S.M. Flatte	(CERN)	REFID=20446
GAY	76B	PL 63B 220	J.B. Gay *et al.*	(CERN, AMST, NIJM) JP	REFID=20445
WELLS	75	NP B101 333	J. Wells *et al.*	(OXF)	REFID=20444
LINGLIN	73	NP B55 408	D. Linglin	(CERN)	REFID=22428
DEFOIX	72	NP B44 125	C. Defoix *et al.*	(CDEF, CERN)	REFID=20435
AMMAR	70	PR D2 430	R. Ammar *et al.*	(KANS, NWES, ANL, WISC)	REFID=20428
BARNES	69C	PRL 23 610	V.E. Barnes *et al.*	(BNL, SYRA)	REFID=20418
CAMPBELL	69	PRL 22 1204	J.H. Campbell *et al.*	(PURD)	REFID=20419
MILLER	69B	PL 29B 255	D.H. Miller *et al.*	(PURD)	REFID=20424
Also		PR 188 2011	W.L. Yen *et al.*	(PURD)	REFID=20425
AMMAR	68	PRL 21 1832	R. Ammar *et al.*	(NWES, ANL)	REFID=20412
ASTIER	67	PL 25B 294	A. Astier *et al.*	(CDEF, CERN, IRAD)	REFID=20405
Includes data of BARLOW 67, CONFORTO 67, and ARMENTEROS 65.					
BARLOW	67	NC 50A 701	J. Barlow *et al.*	(CERN, CDEF, IRAD, LIVP)	REFID=20041
CONFORTO	67	NP B3 469	G. Conforto *et al.*	(CERN, CDEF, IPNP+)	REFID=20411
ARMENTEROS	65	PL 17 344	R. Armenteros *et al.*	(CERN, CDEF)	REFID=20396
ROSENFELD	65	Oxford Conf. 58	A.H. Rosenfeld	(LRL)	REFID=20399