# Further States

NODE=M300

## OMITTED FROM SUMMARY TABLE

This section contains states observed by a single group or states poorly established that thus need confirmation.

NODE=M300

QUANTUM NUMBERS, MASSES, WIDTHS, AND BRANCHING RATIOS

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### $X(360)$ $I^G(J^{PC}) = ?^?(?^{?+})$

NODE=M300K08
NODE=M300K08

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $360 \pm 7 \pm 9$ | $64 \pm 18$ | 2.3k | [1] ABRAAMYAN | 09 | CNTR | 2.75 $dC \rightarrow \gamma\gamma X$ |

[1] Not seen in $pC \rightarrow \gamma\gamma X$ at 5.5 GeV/c.

NODE=M300K08;LINKAGE=AB

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### $X(1070)$ $I^G(J^{PC}) = ?^?(0^{++})$

NODE=M300J07
NODE=M300J07

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | COMMENT |
|---|---|---|---|---|
| $1072 \pm 1$ | $3.5 \pm 0.5$ | [1] VLADIMIRSK...08 | | 40 $\pi^- p \rightarrow K^0_S K^0_S n + m\pi^0$ |

[1] Supersedes GRIGOR'EV 05.

NODE=M300J07;LINKAGE=VL

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### $X(1110)$ $I^G(J^{PC}) = 0^+(\text{even}^{++})$

NODE=M300J30
NODE=M300J30

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $1107 \pm 4$ | $111 \pm 8 \pm 15$ | DAFTARI | 87 | DBC | 0. $\bar{p}n \rightarrow \rho^- \pi^+ \pi^-$ |

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### $f_0(1200–1600)$ $I^G(J^{PC}) = 0^+(0^{++})$

NODE=M300J98
NODE=M300J98

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $1323 \pm 8$ | $237 \pm 20$ | VLADIMIRSK...06 | | SPEC | 40 $\pi^- p \rightarrow K^0_S K^0_S n$ |
| $1480^{+100}_{-150}$ | $1030^{+80}_{-170}$ | [1] ANISOVICH | 03 | SPEC | |
| $1530^{+90}_{-250}$ | $560 \pm 40$ | [2] ANISOVICH | 03 | SPEC | |

OCCUR=2

[1] K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0\pi^0 n$, $\pi^- p \rightarrow K\overline{K} n$, $\pi^+\pi^- \rightarrow \pi^+\pi^-$, $\bar{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$, $\pi^+\pi^-\pi^0$, $K^+K^-\pi^0$, $K^0_S K^0_S \pi^0$, $K^+K^0_S\pi^-$ at rest, $\bar{p}n \rightarrow \pi^-\pi^-\pi^+$, $K^0_S K^-\pi^0$, $K^0_S K^0_S \pi^-$ at rest.

NODE=M300;LINKAGE=KM

[2] K-matrix pole from combined analysis of $\pi^- p \rightarrow \pi^0\pi^0 n$, $\pi^- p \rightarrow K\overline{K} n$, $\bar{p}p \rightarrow \pi^0\pi^0\pi^0$, $\pi^0\eta\eta$, $\pi^0\pi^0\eta$ at rest.

NODE=M300;LINKAGE=MK

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### $X(1420)$ $I^G(J^{PC}) = 2^+(0^{++})$

NODE=M300J61
NODE=M300J61

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $1420 \pm 20$ | $160 \pm 10$ | FILIPPI | 00 | OBLX | 0 $\bar{n}p \rightarrow \pi^+\pi^+\pi^-$ |

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### $X(1545)$ $I^G(J^{PC}) = ?^?(?^{++})$

NODE=M300K07
NODE=M300K07

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | COMMENT |
|---|---|---|---|---|
| $1545 \pm 3$ | $6.0 \pm 2.5$ | [1] VLADIMIRSK...08 | | 40 $\pi^- p \rightarrow K^0_S K^0_S n + m\pi^0$ |

[1] Supersedes VLADIMIRSKII 00.

NODE=M300K07;LINKAGE=VL

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### $X(1575)$ $I^G(J^{PC}) = ?^?(1^{--})$

NODE=M300J08
NODE=M300J08

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $1576^{+49+98}_{-55-91}$ | $818^{+22+64}_{-23-133}$ | [1] ABLIKIM | 06S | BES | $J/\psi \rightarrow K^+K^-\pi^0$ |

[1] A broad peak observed at $K^+K^-$ invariant mass. Mass and width above are its pole position. The observed branching ratio is $B(J/\psi \rightarrow X\pi^0)\, B(X \rightarrow K^+K^-) = (8.5 \pm 0.6^{+2.7}_{-3.6}) \times 10^{-4}$.

NODE=M300J08;LINKAGE=AB

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### $X(1600)$ $I^G(J^{PC}) = 2^+(2^{++})$

NODE=M300J99
NODE=M300J99

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $1600 \pm 100$ | $400 \pm 200$ | [1] ALBRECHT | 91F | ARG | 10.2 $e^+e^- \rightarrow e^+e^- 2(\pi^+\pi^-)$ |

[1] Our estimate. NODE=M300J99;LINKAGE=A

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**$X(1650)$** $I^G(J^{PC}) = 0^-(?^{?-})$ NODE=M300J62

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|---|
| 1652±7 | <50 | 100 | PROKOSHKIN 96 | GAM2 | 32,38 $\pi p \to \omega\eta n$ |

NODE=M300J62

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**$X(1730)$** $I^G(J^{PC}) = ?^?(?^{?+})$ NODE=M300K06

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|---|
| 1731.0±1.2±2.0 | 3.2 ± 0.8 ± 1.3 | 58 | VLADIMIRSK...07 | SPEC | 40 $\pi^- p \to K^0_S K^0_S X$ |

NODE=M300K06

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**$f_2(1750)$** $I^G(J^{PC}) = 0^+(2^{++})$ NODE=M300JAM

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|---|
| 1755±10 | 67 ± 12 | 870 | [1] SCHEGELSKY 06A | RVUE | $\gamma\gamma \to K^0_S K^0_S$ |

NODE=M300JAM

**$\Gamma(K\overline{K})$** NODE=M300JA1

| VALUE (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|
| 17±5 | 870 | [2] SCHEGELSKY 06A | RVUE | $\gamma\gamma \to K^0_S K^0_S$ |

NODE=M300JA1

**$\Gamma(\gamma\gamma)$** NODE=M300JA2

| VALUE (keV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|
| 0.13±0.04 | 870 | [2] SCHEGELSKY 06A | RVUE | $\gamma\gamma \to K^0_S K^0_S$ |

NODE=M300JA2

**$\Gamma(\pi\pi)$** NODE=M300JA3

| VALUE (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|
| 1.3±1.0 | 870 | [2] SCHEGELSKY 06A | RVUE | $\gamma\gamma \to K^0_S K^0_S$ |

NODE=M300JA3

**$\Gamma(\eta\eta)$** NODE=M300JA4

| VALUE (MeV) | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|---|---|---|---|
| 2.0±0.5 | 870 | [2] SCHEGELSKY 06A | RVUE | $\gamma\gamma \to K^0_S K^0_S$ |

NODE=M300JA4

[1] From analysis of L3 data at 91 and 183–209 GeV. NODE=M300JAM;LINKAGE=SC

[2] From analysis of L3 data at 91 and 183–209 GeV and using SU(3) relations. NODE=M300JA;LINKAGE=SC

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**$X(1775)$** $I^G(J^{PC}) = 1^-(?^{-+})$ NODE=M300J60

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 1763±20 | 192 ± 60 | CONDO | 91 | SHF | $\gamma p \to (p\pi^+)(\pi^+\pi^-\pi^-)$ |
| 1787±18 | 118 ± 60 | CONDO | 91 | SHF | $\gamma p \to n\pi^+\pi^+\pi^-$ OCCUR=2 |

NODE=M300J60

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**$X(1850 - 3100)$** $I^G(J^{PC}) = ?^?(1^{--})$ NODE=M300K28

| $\Gamma(e^+e^-)\cdot B(X \to \text{hadrons})$ (eV) | CL% | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| <120 | 90 | [1] ANASHIN | 11 | KEDR | $e^+e^- \to$ hadrons |

[1] This limit is center-of-mass energy dependent. We quote the most stringent one. NODE=M300K28;LINKAGE=AN

NODE=M300K28

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**$X(1855)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J31

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 1856.6±5 | 20 ± 5 | BRIDGES | 86D | SPEC | 0. $\overline{p}d \to \pi\pi N$ |

NODE=M300J31

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**$X(1870)$** $I^G(J^{PC}) = ?^?(2^{??})$ NODE=M300J45

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 1870±40 | 250 ± 30 | ALDE | 86D | GAM4 | 100 $\pi^- p \to 2\eta X$ |

NODE=M300J45

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**$a_3(1875)$** $I^G(J^{PC}) = 1^-(3^{++})$ NODE=M300J95

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 1874±43±96 | 385 ± 121 ± 114 | CHUNG | 02 | B852 | 18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$ |

NODE=M300J95

**B($a_3(1875) \to f_2(1270)\pi$)/B($a_3(1875) \to \rho\pi$)** NODE=M300B7

| VALUE | DOCUMENT ID | | TECN | COMMENT | NODE=M300B7 |
|---|---|---|---|---|---|
| 0.8±0.2 | [1] CHUNG | 02 | B852 | 18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$ | |

[1] Using the observable fractions of 50.0% $\rho\pi$, 56.5% $f_2\pi$, and 11.8% $\rho_3\pi$. NODE=M300B;LINKAGE=C1

**B($a_3(1875) \to \rho_3(1690)\pi$)/B($a_3(1875) \to \rho\pi$)** NODE=M300B8

| VALUE | DOCUMENT ID | | TECN | COMMENT | NODE=M300B8 |
|---|---|---|---|---|---|
| 0.9±0.3 | [1] CHUNG | 02 | B852 | 18.3 $\pi^- p \to \pi^+\pi^-\pi^- p$ | |

[1] Using the observable fractions of 50.0% $\rho\pi$, 56.5% $f_2\pi$, and 11.8% $\rho_3\pi$. NODE=M300B8;LINKAGE=C1

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**$h_1(1900)$** $I^G(J^{PC}) = 0^-(1^{+-})$ NODE=M300A13

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300A13 |
|---|---|---|---|---|---|---|
| $1908\pm6^{+8}_{-4}$ | $175\pm13^{+7}_{-16}$ | ABLIKIM | 24CB | BES3 | $J/\psi \to \phi\eta\pi^0$ | |

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**$a_1(1930)$** $I^G(J^{PC}) = 1^-(1^{++})$ NODE=M300J92

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J92 |
|---|---|---|---|---|---|---|
| $1930^{+30}_{-70}$ | 155 ± 45 | ANISOVICH | 01F | SPEC | 2.0 $\bar{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$ | |

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**$X(1935)$** $I^G(J^{PC}) = 1^+(1^{-?})$ NODE=M300J33

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J33 |
|---|---|---|---|---|---|---|
| 1935±20 | 215 ± 30 | EVANGELIS... | 79 | OMEG | 10,16 $\pi^- p \to \bar{p}pn$ | |

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**$\rho_2(1940)$** $I^G(J^{PC}) = 1^+(2^{--})$ NODE=M300J85

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J85 |
|---|---|---|---|---|---|---|
| 1940±40 | 155 ± 40 | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\bar{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J85;LINKAGE=AY

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**$\omega_3(1945)$** $I^G(J^{PC}) = 0^-(3^{--})$ NODE=M300J65

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J65 |
|---|---|---|---|---|---|---|
| 1945±20 | 115 ± 22 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\bar{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J65;LINKAGE=AZ

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**$a_2(1950)$** $I^G(J^{PC}) = 1^-(2^{++})$ NODE=M300K24

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300K24 |
|---|---|---|---|---|---|---|
| $1950^{+30}_{-70}$ | $180^{+30}_{-70}$ | [1] ANISOVICH | 01F | SPEC | 1.96–2.41 $\bar{p}p$ | |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F. NODE=M300K24;LINKAGE=AN

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**$\omega(1960)$** $I^G(J^{PC}) = 0^-(1^{--})$ NODE=M300J79

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J79 |
|---|---|---|---|---|---|---|
| 1960±25 | 195 ± 60 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\bar{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J79;LINKAGE=AZ

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**$b_1(1960)$** $I^G(J^{PC}) = 1^+(1^{+-})$ NODE=M300J67

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J67 |
|---|---|---|---|---|---|---|
| 1960±35 | 230 ± 50 | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\bar{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J67;LINKAGE=AY

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**$h_1(1965)$** $I^G(J^{PC}) = 0^-(1^{+-})$ NODE=M300J64

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J64 |
|---|---|---|---|---|---|---|
| 1965±45 | 345 ± 75 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\bar{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J64;LINKAGE=AZ

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**$f_1(1970)$** $I^G(J^{PC}) = 0^+(1^{++})$ NODE=M300J1

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE |
|---|---|---|---|---|---|
| 1971±15 | 240 ± 45 | ANISOVICH | 00J | SPEC | NODE=M300J1 |

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**$X(1970)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J46

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|
| 1970±10 | 40 ± 20 | CHLIAPNIK... | 80 | HBC | 32 $K^+ p \to 2K^0_S 2\pi X$ | NODE=M300J46 |

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**$X(1975)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J47

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|---|
| 1973±15 | 80 | 30 | CASO | 70 | HBC | 11.2 $\pi^- p \to \rho 2\pi$ | NODE=M300J47 |

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**$\omega_2(1975)$** $I^G(J^{PC}) = 0^-(2^{--})$ NODE=M300J81

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|
| 1975±20 | 175 ± 25 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\bar{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | NODE=M300J81 |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J81;LINKAGE=AZ

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**$a_2(1990)$** $I^G(J^{PC}) = 1^-(2^{++})$ NODE=M300J2

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|---|
| 2050±10±40 | 190 ± 22 ± 100 | 18k | [1] SCHEGELSKY | 06 | RVUE | $\gamma\gamma \to \pi^+\pi^-\pi^0$ | NODE=M300J2 |
| 2003±10±19 | 249 ± 23 ± 32 | | LU | 05 | B852 | 18 $\pi^- p \to \omega\pi^-\pi^0 p$ | |

[1] From analysis of L3 data at 183–209 GeV. NODE=M300J2;LINKAGE=SC

**$\Gamma(\gamma\gamma)\ \Gamma(\pi^+\pi^-\pi^0)$ / $\Gamma$(total)** NODE=M300J2G

| VALUE (keV) | EVTS | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|
| 0.11±0.04±0.05 | 18k | [1] SCHEGELSKY | 06 | RVUE | $\gamma\gamma \to \pi^+\pi^-\pi^0$ | NODE=M300J2G |

[1] From analysis of L3 data at 183–209 GeV. NODE=M300J2G;LINKAGE=SC

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**$\rho(2000)$** $I^G(J^{PC}) = 1^+(1^{--})$ NODE=M300J77

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|
| 2000±30 | 260 ± 45 | [1] BUGG | 04C | RVUE | Compilation | NODE=M300J77 |
| ~ 1988 | ~ 244 | HASAN | 94 | RVUE | $\bar{p}p \to \pi\pi$ | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300;LINKAGE=AY

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**$f_2(2000)$** $I^G(J^{PC}) = 0^+(2^{++})$ NODE=M300J25

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE |
|---|---|---|---|---|---|---|
| 2001±10 | 312 ± 32 | ANISOVICH | 00J | SPEC | | NODE=M300J25 |
| ~ 1996 | ~ 134 | HASAN | 94 | RVUE | $\bar{p}p \to \pi\pi$ | |

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**$X(2000)$** $I^G(J^{PC}) = 1^-(?^?+)$ NODE=M300K01

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | CHG | COMMENT | NODE |
|---|---|---|---|---|---|---|---|
| 1964±35 | 225 ± 50 | [1] ARMSTRONG | 93D | E760 | | $\bar{p}p \to 3\pi^0 \to 6\gamma$ | NODE=M300K01 |
| ~ 2100 | ~ 500 | [1] ANTIPOV | 77 | CIBS | − | 25 $\pi^- p \to p\pi^-\rho_3$ | |
| 2214±15 | 355 ± 21 | [2] BALTAY | 77 | HBC | 0 | 15 $\pi^- p \to \Delta^{++} 3\pi$ | |
| 2080±40 | 340 ± 80 | KALELKAR | 75 | HBC | + | 15 $\pi^+ p \to p\pi^+\rho_3$ | |

[1] Cannot determine spin to be 3. NODE=M300K01;LINKAGE=AA
[2] BALTAY 77 favors $J^P = ,3^+$. NODE=M300K01;LINKAGE=B

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**$X(2000)$** $I^G(J^{PC}) = ?^?(4^{++})$ NODE=M300J97

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | TECN | COMMENT | NODE |
|---|---|---|---|---|---|
| 1998±3±5 | <15 | VLADIMIRSK...03 | SPEC | $\pi^- p \to K^0_S K^0_S M M$ | NODE=M300J97 |

**$X(2000)$** $I^G(J^{PC}) = 0^-(1^{--})$ NODE=M300A14 NODE=M300A14

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $1992 \pm 12^{+15}_{-6}$ | $132 \pm 22^{+17}_{-4}$ | ABLIKIM | 24CB | BES3 | $J/\psi \to \phi\eta\pi^0$ |

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**$\eta(2010)$** $I^G(J^{PC}) = 0^+(0^{-+})$ NODE=M300J5 NODE=M300J5

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN |
|---|---|---|---|---|
| $2010^{+35}_{-60}$ | $270 \pm 60$ | ANISOVICH | 00J | SPEC |

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**$\pi_1(2015)$** $I^G(J^{PC}) = 1^-(1^{-+})$ NODE=M300J05 NODE=M300J05

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $2014 \pm 20 \pm 16$ | $230 \pm 32 \pm 73$ | 145k | LU | 05 | B852 | 18 $\pi^- p \to \omega\pi^-\pi^0 p$ |
| $2001 \pm 30 \pm 92$ | $333 \pm 52 \pm 49$ | 69k | KUHN | 04 | B852 | 18 $\pi^- p \to \eta\pi^+\pi^-\pi^- p$ |

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**$a_0(2020)$** $I^G(J^{PC}) = 1^-(0^{++})$ NODE=M300J6 NODE=M300J6

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN |
|---|---|---|---|---|
| $2025 \pm 30$ | $330 \pm 75$ | ANISOVICH | 99C | SPEC |

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**$X(2020)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J34 NODE=M300J34

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2015 \pm 3$ | $10 \pm 4$ | FERRER | 99 | RVUE | $\pi p \to p p \bar{p} \pi(\pi)$ |

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**$h_3(2025)$** $I^G(J^{PC}) = 0^-(3^{+-})$ NODE=M300J78 NODE=M300J78

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2025 \pm 20$ | $145 \pm 30$ | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\bar{p} \to \omega\eta$, $\omega\pi^0\pi^0$ |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J78;LINKAGE=AZ

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**$b_3(2030)$** $I^G(J^{PC}) = 1^+(3^{+-})$ NODE=M300J69 NODE=M300J69

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2032 \pm 12$ | $117 \pm 11$ | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\bar{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J69;LINKAGE=AY

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**$a_2(2030)$** $I^G(J^{PC}) = 1^-(2^{++})$ NODE=M300K23 NODE=M300K23

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2030 \pm 20$ | $205 \pm 30$ | [1] ANISOVICH | 01F | SPEC | 1.96–2.41 $\bar{p}p$ |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F. NODE=M300K23;LINKAGE=AN

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**$a_3(2030)$** $I^G(J^{PC}) = 1^-(3^{++})$ NODE=M300K20 NODE=M300K20

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2031 \pm 12$ | $150 \pm 18$ | [1] ANISOVICH | 01F | SPEC | 1.96–2.41 $\bar{p}p$ |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F. NODE=M300K20;LINKAGE=AN

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**$\eta_2(2030)$** $I^G(J^{PC}) = 0^+(2^{-+})$ NODE=M300J8 NODE=M300J8

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN |
|---|---|---|---|---|
| $2030 \pm 5 \pm 15$ | $205 \pm 10 \pm 15$ | ANISOVICH | 00E | SPEC |

**$B(a_2\pi)_{L=0}/B(a_2\pi)_{L=2}$** NODE=M300B1 NODE=M300B1

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $0.05 \pm 0.03$ | [1] ANISOVICH | 11 | SPEC | 0.9–1.94 $p\bar{p}$ |

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E. NODE=M300B1;LINKAGE=AN

**$B(a_0\pi)/B(a_2\pi)_{L=2}$** NODE=M300B2 NODE=M300B2

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $0.10 \pm 0.08$ | [1] ANISOVICH | 11 | SPEC | 0.9–1.94 $p\bar{p}$ |

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E. NODE=M300B2;LINKAGE=AN

**$B(f_2\eta)/B(a_2\pi)_{L=2}$**

NODE=M300B3
NODE=M300B3

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| $0.13\pm0.06$ | [1] ANISOVICH | 11 | SPEC | 0.9–1.94 $p\overline{p}$ |

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E.

NODE=M300B3;LINKAGE=AN

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**$f_3(2050)$** $I^G(J^{PC}) = 0^+(3^{++})$

NODE=M300J7
NODE=M300J7

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2048\pm8$ | $213\pm34$ | ANISOVICH | 00J | SPEC | 2.0 $p\overline{p} \rightarrow \eta\pi^0\pi^0$ |

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**$f_0(2060)$** $I^G(J^{PC}) = 0^+(0^{++})$

NODE=M300J59
NODE=M300J59

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $\sim 2050$ | $\sim 120$ | [1] OAKDEN | 94 | RVUE | 0.36–1.55 $\overline{p}p \rightarrow \pi\pi$ |
| $\sim 2060$ | $\sim 50$ | [1] OAKDEN | 94 | RVUE | 0.36–1.55 $\overline{p}p \rightarrow \pi\pi$ |

OCCUR=2

[1] See SEMENOV 99 and KLOET 96.

NODE=M300J;LINKAGE=A

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**$\pi(2070)$** $I^G(J^{PC}) = 1^-(0^{-+})$

NODE=M300J91
NODE=M300J91

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2070\pm35$ | $310^{+100}_{-\ 50}$ | ANISOVICH | 01F | SPEC | 2.0 $\overline{p}p \rightarrow 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$ |

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**$X(2080)$** $I^G(J^{PC}) = ?^?(?^{??})$

NODE=M300J35
NODE=M300J35

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2080\pm10$ | $110\pm20$ | KREYMER | 80 | STRC | 13 $\pi^- d \rightarrow p\overline{p}n(n_s)$ |

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**$X(2080)$** $I^G(J^{PC}) = ?^?(3^{-?})$

NODE=M300J37
NODE=M300J37

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2080\pm10$ | $190\pm15$ | ROZANSKA | 80 | SPRK | 18 $\pi^- p \rightarrow p\overline{p}n$ |

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**$K_1(2085)$** $I^G(J^{PC}) = ?^?(1^{+?})$

NODE=M300J01
NODE=M300J01

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2084^{+\ 4}_{-\ 2}\pm9$ | $58^{+4}_{-3}\pm25$ | [1,2] ABLIKIM | 23BG | BES3 | $e^+e^- \rightarrow pK^-\overline{\Lambda}$ |
| $2075\pm12\pm5$ | $90\pm35\pm9$ | [3] ABLIKIM | 04J | BES2 | $J/\psi \rightarrow K^-p\overline{\Lambda}$ |

[1] The reported mass and width are the pole positions in the complex (M, Γ) plane.

NODE=M300J01;LINKAGE=A

[2] Signal observed with a statistical significance $>20\sigma$ comes from 3883 candidate events. Spin parity determined to be $J^P = 1^+$ with a statistical significance $>5\sigma$ over $0^-$, $1^-$, $2^+$ hypotheses, and in the range within 3.1–7.5 $\sigma$ with respect to $2^-$.

NODE=M300J01;LINKAGE=B

[3] From a fit in the region $M_{p\overline{\Lambda}} - M_p - M_\Lambda < 150$ MeV. $S$-wave in the $p\overline{\Lambda}$ system preferred.

A similar near-threshold enhancement in the $p\overline{\Lambda}$ system is observed in $B^+ \rightarrow p\overline{\Lambda}\overline{D}^0$ by CHEN 11F.

NODE=M300J01;LINKAGE=AB

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**$a_1(2095)$** $I^G(J^{PC}) = 1^-(1^{++})$

NODE=M300J04
NODE=M300J04

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $2096\pm17\pm121$ | $451\pm41\pm81$ | 69k | KUHN | 04 | B852 | 18 $\pi^- p \rightarrow \eta\pi^+\pi^-\pi^- p$ |

**$B(a_1(2095) \rightarrow f_1(1285)\pi)$ / $B(a_1(2095) \rightarrow a_1(1260))$**

NODE=M300B03
NODE=M300B03

| VALUE | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $3.18\pm0.64$ | 69k | KUHN | 04 | B852 | 18 $\pi^- p \rightarrow \eta\pi^+\pi^-\pi^- p$ |

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**$\eta(2100)$** $I^G(J^{PC}) = 0^+(0^{-+})$

NODE=M300J48
NODE=M300J48

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $2050^{+30+75}_{-24-26}$ | $250^{+36+181}_{-30-164}$ | | [1] ABLIKIM | 16N | BES3 | $J/\psi \rightarrow \gamma K^+ K^- K^+ K^-$ |
| $2103\pm50$ | $187\pm75$ | 586 | [2] BISELLO | 89B | DM2 | $J/\psi \rightarrow 4\pi\gamma$ |

[1] From a partial wave analysis of $J/\psi \to \gamma\phi\phi$, for which the primary signal is $\eta(2225) \to \phi\phi$, and that also finds significant signals for for $0^{-+}$ phase space, $f_0(2100)$, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$, and a previously unseen $0^{-+}$ state $X(2500)$ (M = $2470^{+15+101}_{-19-23}$ MeV, $\Gamma = 230^{+64+56}_{-35-33}$ MeV). NODE=M300J48;LINKAGE=A

[2] ASTON 81B sees no peak, has 850 events in Ajinenko+Barth bins. ARESTOV 80 sees no peak. NODE=M300J;LINKAGE=A1

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**$X(2100)$** $I^G(J^{PC}) = ?^?(0^{??})$ NODE=M300J49

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2100±40 | 250 ± 40 | ALDE | 86D | GAM4 | 100 $\pi^- p \to 2\eta X$ |

NODE=M300J49

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**$X(2110)$** $I^G(J^{PC}) = 1^+(3^{-?})$ NODE=M300J36

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2110±10 | 330 ± 20 | EVANGELIS... | 79 | OMEG | 10,16 $\pi^- p \to \bar{p}pn$ |

NODE=M300J36

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**$X(2120)$** $I^G(J^{PC}) = ?^?(0^{??})$ NODE=M300A07

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $2122.4 \pm 6.7^{+4.7}_{-2.7}$ | $83 \pm 16^{+31}_{-11}$ | 647 | ABLIKIM | 11C | BES3 | $J/\psi \to \gamma\pi^+\pi^-\eta'$ |

NODE=M300A07

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**$\omega(2120)$** or **$\phi(2120)$** $I^G(J^{PC}) = 0^-(?^{--})$ NODE=M300K43

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2119±11±15 | 69 ± 30 ± 5 | [1] ABLIKIM | 24AA | BES3 | $e^+e^- \to \pi^+\pi^-\pi^0$ |

[1] From a fit with more than $5\sigma$ to the Born cross section line shapes of $e^+e^- \to \rho\pi$ and $e^+e^- \to \rho(1450)\pi$. NODE=M300K43;LINKAGE=A

NODE=M300K43

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**$f_2(2140)$** $I^G(J^{PC}) = 0^+(2^{++})$ NODE=M300J50

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| 2141±12 | 49 ± 28 | 389 | GREEN | 86 | MPSF | 400 $pA \to 4KX$ |

NODE=M300J50

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**$X(2150)$** $I^G(J^{PC}) = ?^?(2^{+?})$ NODE=M300J38

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2150±10 | 260 ± 10 | ROZANSKA | 80 | SPRK | 18 $\pi^- p \to p\bar{p}n$ |

NODE=M300J38

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**$a_2(2175)$** $I^G(J^{PC}) = 1^-(2^{++})$ NODE=M300J88

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2175±40 | $310^{+90}_{-45}$ | ANISOVICH | 01F | SPEC | 2.0 $\bar{p}p \to 3\pi^0, \pi^0\eta, \pi^0\eta'$ |

NODE=M300J88

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**$\eta(2190)$** $I^G(J^{PC}) = 0^+(0^{-+})$ NODE=M300J13

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN |
|---|---|---|---|---|
| 2190±50 | 850 ± 100 | BUGG | 99 | BES |

NODE=M300J13

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**$\omega_2(2195)$** $I^G(J^{PC}) = 0^-(2^{--})$ NODE=M300J82

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2195±30 | 225 ± 40 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\bar{p} \to \omega\eta, \omega\pi^0\pi^0$ |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J82;LINKAGE=AZ

NODE=M300J82

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**$X(2210)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J51

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2210^{+79}_{-21}$ | $203^{+437}_{-87}$ | EVANGELIS... | 79B | OMEG | 10 $\pi^- p \to K^+K^- n$ |
| 2207±22 | 130 | CASO | 70 | HBC | 11.2 $\pi^- p$ |

NODE=M300J51

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**$X_2(2210)$** $I^G(J^{PC}) = 0^+(2^{++})$ NODE=M300A05

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2210±60 | 360 ± 120 | [1] KLEMPT | 22 | RVUE | $J/\psi \to \gamma\pi^0\pi^0, \gamma K^0_S K^0_S$ |

NODE=M300A05

[1] Fit of the tensor partial waves from BES3 in the multipole basis. Might be a cluster of $J^{PC} = 2^{++}$ resonances. The ratio of decay widths $KK^-/\pi\pi$ is 0.23 ± 0.05. NODE=M300A05;LINKAGE=A

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**$h_1(2215)$** $I^G(J^{PC}) = 0^-(1^{+-})$ NODE=M300J27

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J27 |
|---|---|---|---|---|---|---|
| 2215±40 | 325 ± 55 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J27;LINKAGE=AZ

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**$\rho_2(2225)$** $I^G(J^{PC}) = 1^+(2^{--})$ NODE=M300J70

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J70 |
|---|---|---|---|---|---|---|
| 2225±35 | $335^{+100}_{-\ 50}$ | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J70;LINKAGE=AY

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**$\rho_4(2230)$** $I^G(J^{PC}) = 1^+(4^{--})$ NODE=M300J74

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J74 |
|---|---|---|---|---|---|---|
| 2230±25 | 210 ± 30 | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J74;LINKAGE=AY

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**$b_1(2240)$** $I^G(J^{PC}) = 1^+(1^{+-})$ NODE=M300J87

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J87 |
|---|---|---|---|---|---|---|
| 2240±35 | 320 ± 85 | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J87;LINKAGE=AY

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**$f_2(2240)$** $I^G(J^{PC}) = 0^+(2^{++})$ NODE=M300K26

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300K26 |
|---|---|---|---|---|---|---|
| 2240±15 | 241 ± 30 | [1] ANISOVICH | 00J | SPEC | 1.92–2.41 $p\overline{p}$ | |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| ∼ 2226 | ∼ 226 | HASAN | 94 | RVUE | $p\overline{p} \to \pi\pi$ | |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99F, ANISOVICH 99J, ANISOVICH 99K, and ANISOVICH 00B. See also ANISOVICH 12. NODE=M300K26;LINKAGE=AN

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**$b_3(2245)$** $I^G(J^{PC}) = 1^+(3^{+-})$ NODE=M300K10

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE=M300K10 |
|---|---|---|---|---|---|
| 2245±50 | 320 ± 70 | [1] BUGG | 04C | RVUE | |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300K10;LINKAGE=AY

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**$\eta_2(2250)$** $I^G(J^{PC}) = 0^+(2^{-+})$ NODE=M300J17

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE=M300J17 |
|---|---|---|---|---|---|
| 2248±20 | 280 ± 20 | ANISOVICH | 00I | SPEC | |
| 2267±14 | 290 ± 50 | ANISOVICH | 00J | SPEC | |

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**$\pi_4(2250)$** $I^G(J^{PC}) = 1^-(4^{-+})$ NODE=M300J73

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J73 |
|---|---|---|---|---|---|---|
| 2250±15 | 215 ± 25 | ANISOVICH | 01F | SPEC | 2.0 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$ | |

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**$\omega_4(2250)$** $I^G(J^{PC}) = 0^-(4^{--})$ NODE=M300J84

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J84 |
|---|---|---|---|---|---|---|
| 2250±30 | 150 ± 50 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J84;LINKAGE=AZ

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**$\omega_5(2250)$** $I^G(J^{PC}) = 0^-(5^{--})$ NODE=M300K11 NODE=M300K11

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN |
|---|---|---|---|---|
| 2250±70 | 320 ± 95 | [1] BUGG | 04 | RVUE |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300;LINKAGE=AZ

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**$\omega_3(2255)$** $I^G(J^{PC}) = 0^-(3^{--})$ NODE=M300J66 NODE=M300J66

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2255±15 | 175 ± 30 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$ |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J66;LINKAGE=AZ

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**$a_4(2255)$** $I^G(J^{PC}) = 1^-(4^{++})$ NODE=M300K21 NODE=M300K21

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2237± 5 | 291 ± 12 | UMAN | 06 | E835 | 5.2 $\overline{p}p \to \eta\eta\pi^0$ |
| 2255±40 | $330^{+110}_{-\ 50}$ | [1] ANISOVICH | 01F | SPEC | 1.96–2.41 $\overline{p}p$ |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, and ANISOVICH 01F. NODE=M300K21;LINKAGE=AN

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**$a_2(2255)$** $I^G(J^{PC}) = 1^-(2^{++})$ NODE=M300K22 NODE=M300K22

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2255±20 | 230 ± 15 | [1] ANISOVICH | 01G | SPEC | 1.96–2.41 $\overline{p}p$ |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, ANISOVICH 01F, and ANISOVICH 01G. NODE=M300K22;LINKAGE=AN

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**$X(2260)$** $I^G(J^{PC}) = 0^+(4^{+?})$ NODE=M300J40 NODE=M300J40

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2260±20 | 400 ± 100 | EVANGELIS... | 79 | OMEG | 10,16 $\pi^- p \to \overline{p}pn$ |

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**$\rho(2270)$** $I^G(J^{PC}) = 1^+(1^{--})$ NODE=M300J86 NODE=M300J86

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2265±40 | 325 ± 80 | [1] ANISOVICH | 02 | SPEC | 0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ |
| 2280±50 | 440 ± 110 | ATKINSON | 85 | OMEG | 20–70 $\gamma p \to p\omega\pi^+\pi^-\pi^0$ |

[1] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02. NODE=M300J86;LINKAGE=AY

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**$a_1(2270)$** $I^G(J^{PC}) = 1^-(1^{++})$ NODE=M300J72 NODE=M300J72

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| $2270^{+55}_{-40}$ | $305^{+70}_{-40}$ | ANISOVICH | 01F | SPEC | 2.0 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$ |

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**$h_3(2275)$** $I^G(J^{PC}) = 0^-(3^{+-})$ NODE=M300J28 NODE=M300J28

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2275±25 | 190 ± 45 | [1] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$ |

[1] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J28;LINKAGE=AZ

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**$a_3(2275)$** $I^G(J^{PC}) = 1^-(3^{++})$ NODE=M300K19 NODE=M300K19

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2275±35 | $350^{+100}_{-\ 50}$ | [1] ANISOVICH | 01G | SPEC | 1.96–2.41 $\overline{p}p$ |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99E, ANISOVICH 01F, and ANISOVICH 01G. NODE=M300K19;LINKAGE=AN

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**$\pi_2(2285)$** $I^G(J^{PC}) = 1^-(2^{-+})$ NODE=M300K25 NODE=M300K25

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2285±20±25 | 250 ± 20 ± 25 | [1] ANISOVICH | 11 | SPEC | 0.9–1.94 $p\overline{p}$ |

[1] Reanalysis of ADOMEIT 96 and ANISOVICH 00E. NODE=M300K25;LINKAGE=AN

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**$\omega_3(2285)$** $I^G(J^{PC}) = 0^-(3^{--})$ NODE=M300J83

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J83 |
|---|---|---|---|---|---|---|
| 2278±28 | 224 ± 50 | [1] BUGG | 04A | RVUE | | |
| 2285±60 | 230 ± 40 | [2] ANISOVICH | 02B | SPEC | 0.6–1.9 $p\overline{p} \to \omega\eta$, $\omega\pi^0\pi^0$ | |

[1] Partial wave analysis of the data on $p\overline{p} \to \overline{\Lambda}\Lambda$ from BARNES 00. NODE=M300J83;LINKAGE=BU

[2] From the combined analysis of ANISOVICH 00D, ANISOVICH 01C, and ANISOVICH 02B. NODE=M300J83;LINKAGE=AZ

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**$\omega(2290)$** $I^G(J^{PC}) = 0^-(1^{--})$ NODE=M300J02

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE=M300J02 |
|---|---|---|---|---|---|
| 2290±20 | 275 ± 35 | [1] BUGG | 04A | RVUE | |

[1] Partial wave analysis of the data on $p\overline{p} \to \overline{\Lambda}\Lambda$ from BARNES 00. NODE=M300J02;LINKAGE=BU

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**$f_2(2295)$** $I^G(J^{PC}) = 0^+(2^{++})$ NODE=M300K27

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300K27 |
|---|---|---|---|---|---|---|
| 2293±13 | 216 ± 37 | [1] ANISOVICH | 00J | SPEC | 1.92–2.41 $p\overline{p}$ | |

[1] From the combined analysis of ANISOVICH 99C, ANISOVICH 99F, ANISOVICH 99J, ANISOVICH 99K, and ANISOVICH 00B. See also ANISOVICH 12. NODE=M300K27;LINKAGE=AN

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**$f_3(2300)$** $I^G(J^{PC}) = 0^+(3^{++})$ NODE=M300J19

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE=M300J19 |
|---|---|---|---|---|---|
| 2334±25 | 200 ± 20 | [1] BUGG | 04A | RVUE | |

[1] Partial wave analysis of the data on $p\overline{p} \to \overline{\Lambda}\Lambda$ from BARNES 00. NODE=M300J19;LINKAGE=BU

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**$f_1(2310)$** $I^G(J^{PC}) = 0^+(1^{++})$ NODE=M300J23

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE=M300J23 |
|---|---|---|---|---|---|
| 2310±60 | 255 ± 70 | ANISOVICH | 00J | SPEC | |

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**$\eta(2320)$** $I^G(J^{PC}) = 0^+(0^{-+})$ NODE=M300J18

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | NODE=M300J18 |
|---|---|---|---|---|---|
| 2320±15 | 230 ± 35 | [1] ANISOVICH | 00M | SPEC | |

[1] From the combined analysis of $\overline{p}p \to \eta\eta\eta$ from ANISOVICH 00M and $\overline{p}p \to \eta\pi^0\pi^0$ from ANISOVICH 00J. NODE=M300;LINKAGE=B

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**$\eta_4(2330)$** $I^G(J^{PC}) = 0^+(4^{-+})$ NODE=M300J22

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J22 |
|---|---|---|---|---|---|---|
| 2328±38 | 240 ± 90 | ANISOVICH | 00J | SPEC | 2.0 $p\overline{p} \to \eta\pi^0\pi^0$ | |

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**$\omega(2330)$** $I^G(J^{PC}) = 0^-(1^{--})$ NODE=M300J53

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J53 |
|---|---|---|---|---|---|---|
| 2330±30 | 435 ± 75 | ATKINSON | 88 | OMEG | 25–50 $\gamma p \to \rho^{\pm}\rho^0\pi^{\mp}$ | |

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**$X(2340)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J54

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT | NODE=M300J54 |
|---|---|---|---|---|---|---|---|
| 2340±20 | 180 ± 60 | 126 | [1] BALTAY | 75 | HBC | 15 $\pi^+ p \to p5\pi$ | |

[1] Dominant decay into $\rho^0\rho^0\pi^+$. BALTAY 78 finds confirmation in $2\pi^+\pi^-2\pi^0$ events which contain $\rho^+\rho^0\pi^0$ and $2\rho^+\pi^-$. NODE=M300J;LINKAGE=B1

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**$\pi(2360)$** $I^G(J^{PC}) = 1^-(0^{-+})$ NODE=M300J90

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J90 |
|---|---|---|---|---|---|---|
| 2360±25 | $300^{+100}_{-50}$ | ANISOVICH | 01F | SPEC | 2.0 $\overline{p}p \to 3\pi^0$, $\pi^0\eta$, $\pi^0\eta'$ | |

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**$X(2360)$** $I^G(J^{PC}) = ?^?(4^{+?})$ NODE=M300J42

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J42 |
|---|---|---|---|---|---|---|
| $2360 \pm 10$ | $430 \pm 30$ | ROZANSKA | 80 | SPRK | $18\ \pi^- p \rightarrow\ p\bar{p}n$ | |

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

| | | | | | | |
|---|---|---|---|---|---|---|
| $2356 \pm 7 \pm 15$ | $304 \pm 28 \pm 54$ | [1] ABLIKIM | 23AY | BES3 | $e^+e^- \rightarrow\ (\Lambda\overline{\Lambda})\eta$ | |

[1] Assuming $J^{PC} = 1^{--}$. NODE=M300J42;LINKAGE=A

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**$X(2440)$** $I^G(J^{PC}) = ?^?(5^{-?})$ NODE=M300J43

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J43 |
|---|---|---|---|---|---|---|
| $2440 \pm 10$ | $310 \pm 20$ | ROZANSKA | 80 | SPRK | $18\ \pi^- p \rightarrow\ p\bar{p}n$ | |

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**$a_6(2450)$** $I^G(J^{PC}) = 1^-(6^{++})$ NODE=M300K12

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300K12 |
|---|---|---|---|---|---|---|
| $2450 \pm 130$ | $400 \pm 250$ | CLELAND | 82B | SPEC | $50\ \pi p \rightarrow\ K^0_S K^{\pm} p$ | |

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**$X(2540)$** $I^G(J^{PC}) = 0^+(0^{++})$ NODE=M300K30

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300K30 |
|---|---|---|---|---|---|---|
| $2539 \pm 14^{+38}_{-14}$ | $274^{+77+126}_{-61-163}$ | UEHARA | 13 | BELL | $\gamma\gamma \rightarrow\ K^0_S K^0_S$ | |

**$\Gamma(\gamma\gamma) \times B(K\overline{K})$** NODE=M300K3G

| VALUE (eV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300K3G |
|---|---|---|---|---|---|
| $40^{+9+17}_{-7-40}$ | UEHARA | 13 | BELL | $\gamma\gamma \rightarrow\ K^0_S K^0_S$ | |

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**$X(2600)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300A01

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300A01 |
|---|---|---|---|---|---|---|
| $2618.3 \pm 2.0^{+16.3}_{-1.4}$ | $195 \pm 5^{+26}_{-17}$ | ABLIKIM | 22G | BES3 | $J/\psi \rightarrow\ \gamma\pi^+\pi^-\eta'$ | |

**$B(J/\psi \rightarrow\ \gamma X(2600)) \times B(X(2600) \rightarrow\ f_0(1500)\eta') \times B(f_0(1500) \rightarrow\ \pi^+\pi^-)$** NODE=M300A02

| VALUE (units $10^{-5}$) | DOCUMENT ID | | TECN | COMMENT | NODE=M300A02 |
|---|---|---|---|---|---|
| $3.09 \pm 0.21^{+1.14}_{-0.77}$ | [1] ABLIKIM | 22G | BES3 | $J/\psi \rightarrow\ \gamma\pi^+\pi^-\eta'$ | |

[1] The $\pi^+\pi^-$ mass spectrum is described by a coherent sum of two Breit-Wigner resonances, $f_0(1500)$ and a new $X(1540)$ with mass $1540.2 \pm 7.0^{+36.3}_{-6.1}$ MeV and width $157 \pm 19^{+11}_{-77}$ MeV. NODE=M300A02;LINKAGE=A

**$B(J/\psi \rightarrow\ \gamma X(2600)) \times B(X(2600) \rightarrow\ X(1540)\eta') \times B(X(1540) \rightarrow\ \pi^+\pi^-)$** NODE=M300A03

| VALUE (units $10^{-5}$) | DOCUMENT ID | | TECN | COMMENT | NODE=M300A03 |
|---|---|---|---|---|---|
| $2.69 \pm 0.19^{+0.38}_{-1.21}$ | [1] ABLIKIM | 22G | BES3 | $J/\psi \rightarrow\ \gamma\pi^+\pi^-\eta'$ | |

[1] The $\pi^+\pi^-$ mass spectrum is described by a coherent sum of two Breit-Wigner resonances, $f_0(1500)$ and a new $X(1540)$ with mass $1540.2 \pm 7.0^{+36.3}_{-6.1}$ MeV and width $157 \pm 19^{+11}_{-77}$ MeV. NODE=M300A03;LINKAGE=A

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**$K^*_0(2600)$** $I(J^P) = 1/2(0^+)$ NODE=M300A09

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300A09 |
|---|---|---|---|---|---|---|
| $2662 \pm 59 \pm 201$ | $480 \pm 47 \pm 72$ | [1] AAIJ | 23AH | LHCB | $B^+ \rightarrow\ K^+(K^0_S K\pi)$ | |

[1] From Dalitz plot analyses of $\eta_c(1S, 2S) \rightarrow\ K^0_S K^+\pi^-$ + c.c.. NODE=M300A09;LINKAGE=A

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**$X(2632)$** $I^G(J^{PC}) = ?^?(?^{??})$ NODE=M300J03

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT | NODE=M300J03 |
|---|---|---|---|---|---|---|
| $2635.2 \pm 3.3$ | | [1] EVDOKIMOV | 04 | SELX | $X(2632) \rightarrow\ D^+_s\eta$ | |
| $2631.6 \pm 2.1$ | $< 17$ | [2] EVDOKIMOV | 04 | SELX | $X(2632) \rightarrow\ D^0K^+$ | OCCUR=2 |

[1] From a mass difference to $D^+_s$ of $666.9 \pm 3.3$ MeV. NODE=M300J03;LINKAGE=EV

[2] From a mass difference to $D^0$ of $767.0 \pm 2.0$ MeV. NODE=M300J03;LINKAGE=ED

### $B(X(2632) \to D^0 K^+)/B(X(2632) \to D_s^+ \eta)$

NODE=M300B01
NODE=M300B01

| VALUE | DOCUMENT ID | | TECN |
|---|---|---|---|
| 0.14±0.06 | [1] EVDOKIMOV | 04 | SELX |

[1] Possible interpretation of this decay pattern is discussed by YASUI 07.

NODE=M300B01;LINKAGE=YA

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### X(2680) $I^G(J^{PC}) = ?^?(?^{??})$

NODE=M300J55
NODE=M300J55

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2676±27 | 150 | CASO | 70 | HBC | 11.2 $\pi^- p \to \rho^- \pi^+ \pi^- p$ |

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### X(2710) $I^G(J^{PC}) = ?^?(6^{+?})$

NODE=M300J44
NODE=M300J44

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2710±20 | 170 ± 40 | ROZANSKA | 80 | SPRK | 18 $\pi^- p \to p\bar{p}n$ |

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### X(2750) $I^G(J^{PC}) = ?^?(7^{-?})$

NODE=M300J56
NODE=M300J56

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 2747±32 | 195 ± 75 | DENNEY | 83 | LASS | 10 $\pi^+ p \to K^+ K^- \pi^+ p$ |

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### $f_6(3100)$ $I^G(J^{PC}) = 0^+(6^{++})$

NODE=M300J06
NODE=M300J06

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 3100±100 | 700 ± 130 | BINON | 05 | GAMS | 33 $\pi^- p \to \eta\eta n$ |

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### X(3250) $I^G(J^{PC}) = ?^?(?^{??})$ 3-Body Decays

NODE=M300J57
NODE=M300J57

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 3250±8±20 | 45 ± 18 | ALEEV | 93 | BIS2 | $X(3250) \to \Lambda\bar{p}K^+$ |
| 3265±7±20 | 40 ± 18 | ALEEV | 93 | BIS2 | $X(3250) \to \bar{\Lambda}pK^-$ |

OCCUR=2

### X(3250) $I^G(J^{PC}) = ?^?(?^{??})$ 4-Body Decays

NODE=M300J58
NODE=M300J58

| MASS (MeV) | WIDTH (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 3245±8±20 | 25 ± 11 | ALEEV | 93 | BIS2 | $X(3250) \to \Lambda\bar{p}K^+\pi^\pm$ |
| 3250±9±20 | 50 ± 20 | ALEEV | 93 | BIS2 | $X(3250) \to \bar{\Lambda}pK^-\pi^\mp$ |
| 3270±8±20 | 25 ± 11 | ALEEV | 93 | BIS2 | $X(3250) \to K^0_S p\bar{p}K^\pm$ |

OCCUR=2
OCCUR=3

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### X(3350) $I^G(J^{PC}) = ?^?(?^{??})$

NODE=M300J09
NODE=M300J09

| MASS (MeV) | WIDTH (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $3350^{+10}_{-20}$±20 | $70^{+40}_{-30}$ ± 40 | 50 ± 10 | [1] GABYSHEV | 06A | BELL | $B^- \to \Lambda_c^+ \bar{p}\pi^-$ |

[1] A similar enhancement in the $\Lambda_c^+ \bar{p}$ final state is also reported by BABAR collaboration in AUBERT 10H.

NODE=M300J09;LINKAGE=AU

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### $\psi(3760)$ $I^G(J^{PC}) = ?^?(1^{--})$

NODE=M300A10
NODE=M300A10

| MASS (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| 3751.9±3.8±2.8 | [1] ABLIKIM | 24BO | BES3 | $e^+e^- \to$ hadrons |
| ~ 3740 | [1] ABLIKIM | 24E | BES3 | $e^+e^- \to$ light hadrons |

[1] Fit to cross sections for $\sqrt{s}$ = 3645 to 3871 MeV.

NODE=M300A10;LINKAGE=A

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### $\psi(3780)$ $I^G(J^{PC}) = ?^?(1^{--})$

NODE=M300A11
NODE=M300A11

| MASS (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| 3778.7±0.5±0.3 | [1] ABLIKIM | 24BO | BES3 | $e^+e^- \to$ hadrons |
| ~ 3780 | [1] ABLIKIM | 24E | BES3 | $e^+e^- \to$ light hadrons |

[1] Fit to cross sections for $\sqrt{s}$ = 3645 to 3871 MeV.

NODE=M300A11;LINKAGE=A

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### $\psi(3810)$ $I^G(J^{PC}) = ?^?(1^{--})$

NODE=M300A12
NODE=M300A12

| MASS (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| 3804.5±0.9±0.9 | [1] ABLIKIM | 24BO | BES3 | $e^+e^- \to$ hadrons |
| ~ 3806 | [1] ABLIKIM | 24E | BES3 | $e^+e^- \to$ light hadrons |

[1] Fit to cross sections for $\sqrt{s}$ = 3645 to 3871 MeV.

NODE=M300A12;LINKAGE=A

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**$h_c(4000)$** $I^G(J^{PC}) = 0^-(1^{+-})$

NODE=M300A15
NODE=M300A15

| MASS (MeV) | WIDTH (MeV) | EVTS | | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|---|
| $4000^{+17+29}_{-14-22}$ | $184^{+71+97}_{-45-61}$ | 1.6k | [1] | AAIJ | 24AB | LHCB | $B^+ \to D^{*\pm} D^{\mp} K^+$ |

[1] From a simultaneous amplitude analysis of $B^+ \to D^{*+} D^- K^+$, $B^+ \to D^{*-} D^+ K^+$ and their c.c.

NODE=M300A15;LINKAGE=A

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**$\chi_{c1}(4010)$** $I^G(J^{PC}) = 0^+(1^{++})$

NODE=M300A17
NODE=M300A17

| MASS (MeV) | WIDTH (MeV) | EVTS | | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|---|
| $4012.5^{+3.6+4.1}_{-3.9-3.7}$ | $62.7^{+7.0+6.4}_{-6.4-6.6}$ | 1.6k | [1] | AAIJ | 24AB | LHCB | $B^+ \to D^{*\pm} D^{\mp} K^+$ |

[1] From a simultaneous amplitude analysis of $B^+ \to D^{*+} D^- K^+$, $B^+ \to D^{*-} D^+ K^+$ and their c.c.

NODE=M300A17;LINKAGE=A

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**$h_c(4300)$** $I^G(J^{PC}) = 0^-(1^{+-})$

NODE=M300A16
NODE=M300A16

| MASS (MeV) | WIDTH (MeV) | EVTS | | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|---|
| $4307.3^{+6.4+3.3}_{-6.6-4.1}$ | $58^{+28+28}_{-16-25}$ | 1.6k | [1] | AAIJ | 24AB | LHCB | $B^+ \to D^{*\pm} D^{\mp} K^+$ |

[1] From a simultaneous amplitude analysis of $B^+ \to D^{*+} D^- K^+$, $B^+ \to D^{*-} D^+ K^+$ and their c.c.

NODE=M300A16;LINKAGE=A

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**$\psi(4500)$** $I^G(J^{PC}) = 0^-(1^{--})$

NODE=M300K39
NODE=M300K39

| MASS (MeV) | WIDTH (MeV) | | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| $4544.2 \pm 18.7 \pm 1.7$ | $116.1 \pm 33.5 \pm 1.7$ | [1] | ABLIKIM | 24D | BES3 | $e^+ e^- \to \omega\gamma J/\psi$ |
| $4469.1 \pm 26.2 \pm 3.6$ | $246.3 \pm 36.7 \pm 9.4$ | [2] | ABLIKIM | 23X | BES3 | $e^+ e^- \to D^{*0} D^{*-} \pi^+$ |
| $4484.7 \pm 13.3 \pm 24.1$ | $111.1 \pm 30 \pm 15.2$ | [3] | ABLIKIM | 22AU | BES3 | $e^+ e^- \to K^+ K^- J/\psi$ |

[1] Assuming one single Breit-Wigner resonance in $\omega\chi_{c2}(1P)$ ($\chi_{c2} \to \gamma J/\psi$). Measured $\Gamma_{ee} \cdot \mathrm{B}(\omega\chi_{c1}(1P)) = 1.86 \pm 0.32 \pm 0.13$ eV.

NODE=M300K39;LINKAGE=C

[2] From a cross-section measurement of $e^+ e^- \to D^{*0} D^{*-} \pi^+$ between 4.189 and 4.951 GeV, assuming a coherent sum of 3 Breit-Wigner resonances plus a continuum amplitude. $\Gamma(e^+ e^-) \cdot \mathrm{B}(D^{*0} D^{*-} \pi^+) = 107$–$1744$ eV depending on solutions I – VIII with the same fit qualities. The two other resonances have masses (widths) $4209.6 \pm 7.5$ ($81.6 \pm 19.9$) MeV and $4675.3 \pm 29.7$ ($218.3 \pm 73.5$) MeV.

NODE=M300K39;LINKAGE=A

[3] ABLIKIM 22AU cross sections analysis of the process $e^+ e^- \to K^+ K^- J/\psi$ at c.m. energies 4.127–4.600 GeV from 15.6 fb$^{-1}$ of data.

NODE=M300K39;LINKAGE=B

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| ANISOVICH | 00D | PL B476 15 | A.V. Anisovich *et al.* | | REFID=47944 |
| ANISOVICH | 00E | PL B477 19 | A.V. Anisovich *et al.* | | REFID=47945 |
| ANISOVICH | 00I | PL B491 40 | A.V. Anisovich *et al.* | | REFID=47949 |
| ANISOVICH | 00J | PL B491 47 | A.V. Anisovich *et al.* | (RAL, LOQM, PNPI+) | REFID=47950 |
| ANISOVICH | 00M | PL B496 145 | A.V. Anisovich *et al.* | | REFID=48009 |
| BARNES | 00 | PR C62 055203 | P.D. Barnes *et al.* | | REFID=47965 |
| FILIPPI | 00 | PL B495 284 | A. Filippi *et al.* | (OBELIX Experiment) | REFID=48006 |
| VLADIMIRSKII | 00 | JETPL 72 486 | V.V. Vladimirskii *et al.* | | REFID=47997 |
| | | Translated from ZETFP 72 698. | | | |
| ANISOVICH | 99C | PL B452 173 | A.V. Anisovich *et al.* | | REFID=46903 |
| ANISOVICH | 99E | PL B452 187 | A.V. Anisovich *et al.* | | REFID=46902 |
| ANISOVICH | 99F | NP A651 253 | A.V. Anisovich *et al.* | | REFID=46926 |
| ANISOVICH | 99J | PL B471 271 | A.V. Anisovich *et al.* | | REFID=47416 |
| ANISOVICH | 99K | PL B468 309 | A.V. Anisovich *et al.* | | REFID=47472 |
| BUGG | 99 | PL B458 511 | D.V. Bugg *et al.* | | REFID=46938 |
| FERRER | 99 | EPJ C10 249 | A. Ferrer *et al.* | | REFID=47404 |
| SEMENOV | 99 | SPU 42 847 | S.V. Semenov | | REFID=47363 |
| | | Translated from UFN 42 937. | | | |
| ADOMEIT | 96 | ZPHY C71 227 | J. Adomeit *et al.* | (Crystal Barrel Collab.) | REFID=45202 |
| KLOET | 96 | PR D53 6120 | W.M. Kloet, F. Myhrer | (RUTG, NORD) | REFID=45212 |
| PROKOSHKIN | 96 | PD 41 247 | Y.D. Prokoshkin, V.D. Samoilenko | (SERP) | REFID=45182 |
| | | Translated from DANS 348 481. | | | |
| HASAN | 94 | PL B334 215 | A. Hasan, D.V. Bugg | (LOQM) | REFID=44103 |
| OAKDEN | 94 | NP A574 731 | M.N. Oakden, M.R. Pennington | (DURH) | REFID=45210 |
| ALEEV | 93 | PAN 56 1358 | A.N. Aleev *et al.* | (BIS-2 Collab.) | REFID=43668 |
| | | Translated from YAF 56 100. | | | |
| ARMSTRONG | 93D | PL B307 399 | T.A. Armstrong *et al.* | (FNAL, FERR, GENO+) | REFID=43596 |
| ALBRECHT | 91F | ZPHY C50 1 | H. Albrecht *et al.* | (ARGUS Collab.) | REFID=41658 |
| CONDO | 91 | PR D43 2787 | G.T. Condo *et al.* | (SLAC Hybrid Collab.) | REFID=41588 |
| BISELLO | 89B | PR D39 701 | G. Busetto *et al.* | (DM2 Collab.) | REFID=40575 |
| ATKINSON | 88 | ZPHY C38 535 | M. Atkinson *et al.* | (BONN, CERN, GLAS+) | REFID=40556 |
| DAFTARI | 87 | PRL 58 859 | I.K. Daftari *et al.* | (SYRA) | REFID=40412 |
| ALDE | 86D | NP B269 485 | D.M. Alde *et al.* | (BELG, LAPP, SERP, CERN+) | REFID=20765 |
| BRIDGES | 86D | PL B180 313 | D.L. Bridges *et al.* | (SYRA, BNL, CASE+) | REFID=21984 |
| GREEN | 86 | PRL 56 1639 | D.R. Green *et al.* | (FNAL, ARIZ, FSU+) | REFID=21872 |
| ATKINSON | 85 | ZPHY C29 333 | M. Atkinson *et al.* | (BONN, CERN, GLAS+) | REFID=22000 |
| DENNEY | 83 | PR D28 2726 | D.L. Denney *et al.* | (IOWA, MICH) | REFID=20754 |
| CLELAND | 82B | NP B208 228 | W.E. Cleland *et al.* | (DURH, GEVA, LAUS+) | REFID=21281 |
| ASTON | 81B | NP B189 205 | D. Aston *et al.* | (BONN, CERN, EPOL, GLAS+) | REFID=11553 |
| ARESTOV | 80 | IHEP 80-165 | Y.I. Arestov *et al.* | (SERP) | REFID=22312 |
| CHLIAPNIK... | 80 | ZPHY C3 285 | P.V. Chliapnikov *et al.* | (SERP, BRUX, MONS) | REFID=21996 |
| KREYMER | 80 | PR D22 36 | A.E. Kreymer *et al.* | (IND, PURD, SLAC+) | REFID=21970 |
| ROZANSKA | 80 | NP B162 505 | M. Rozanska *et al.* | (MPIM, CERN) | REFID=21774 |
| EVANGELIS... | 79 | NP B153 253 | C. Evangelista *et al.* | (BARI, BONN, CERN+) | REFID=21966 |
| EVANGELIS... | 79B | NP B154 381 | C. Evangelista *et al.* | (BARI, BONN, CERN+) | REFID=21967 |
| BALTAY | 78 | PR D17 52 | C. Baltay *et al.* | (COLU, BING) | REFID=21569 |
| ANTIPOV | 77 | NP B119 45 | Y.M. Antipov *et al.* | (SERP, GEVA) | REFID=20728 |
| BALTAY | 77 | PRL 39 591 | C. Baltay, C.V. Cautis, M. Kalelkar | (COLU) | REFID=20847 |
| BALTAY | 75 | PRL 35 891 | C. Baltay *et al.* | (COLU, BING) | REFID=21994 |
| KALELKAR | 75 | Thesis Nevis 207 | M.S. Kalelkar | (COLU) | REFID=21564 |
| CASO | 70 | LNC 3 707 | C. Caso *et al.* | (GENO, HAMB, MILA, SACL) | REFID=20590 |