# $X(1835)$

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

OMITTED FROM SUMMARY TABLE

Needs confirmation. Seen by BAI 03F and ABLIKIM 05R in radiative decays of the $J/\psi$. Evidence for a threshold enhancement in the $p\overline{p}$ mass spectrum was also reported by ABE 02K, AUBERT,B 05L, and WANG 05A in $B^+ \to p\overline{p}K^+$, WANG 05A in $B^0 \to p\overline{p}K^0_S$, ABE 02W in $\overline{B}^0 \to p\overline{p}D^0$, and WEI 08 in $B^+ \to p\overline{p}\pi^+$ decays. Not seen by ATHAR 06 in $\Upsilon(1S) \to p\overline{p}\gamma$.

## $X(1835)$ MASS

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| **1833.7± 6.1± 2.7** | 264 | ABLIKIM | 05R | BES2 | $J/\psi \to \gamma\pi^+\pi^-\eta'$ |

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

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| 1812 $^{+19}_{-26}$ ±18 | 95 | [1] ABLIKIM | 06J | BES2 | $J/\psi \to \gamma\omega\phi$ |
| 1831 ± 7 | | [2] ABLIKIM | 05R | BES2 | $J/\psi \to \gamma p\overline{p}$ |

[1] Favors $J^{PC} = 0^{++}$ quantum numbers assignment.

[2] From the fit including final state interaction effects in isospin 0 $S$-wave according to SIBIRTSEV 05A. Systematic errors not estimated.

## $X(1835)$ WIDTH

| VALUE (MeV) | CL% | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| **67.7±20.3± 7.7** | | 264 | ABLIKIM | 05R | BES2 | $J/\psi \to \gamma\pi^+\pi^-\eta'$ |

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

| VALUE (MeV) | CL% | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|---|
| 105 ±20 ±28 | | 95 | [3] ABLIKIM | 06J | BES2 | $J/\psi \to \gamma\omega\phi$ |
| < 153 | 90 | | [4] ABLIKIM | 05R | BES2 | $J/\psi \to \gamma p\overline{p}$ |

[3] Favors $J^{PC} = 0^{++}$ quantum numbers assignment.

[4] From the fit including final state interaction effects in isospin 0 $S$-wave according to SIBIRTSEV 05A. Systematic errors not estimated.

## $X(1835)$ DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $p\overline{p}$ | seen |
| $\Gamma_2$ | $\pi^+\pi^-\eta'$ | seen |
| $\Gamma_3$ | $\omega\phi$ | seen |

## $X(1835)$ BRANCHING RATIOS

### $\Gamma(p\overline{p})/\Gamma(\pi^+\pi^-\eta')$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\Gamma_1/\Gamma_2$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|

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

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| 0.333 | ABLIKIM | 05R | BES2 | $J/\psi \to \gamma\pi^+\pi^-\eta'$ |

$\Gamma\big(\omega\phi\big)/\Gamma_{\textbf{total}}$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\Gamma_3/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **seen** | ABLIKIM | 06J | BES2 | $J/\psi \to \gamma\omega\phi$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| not seen | [5] LIU | 09 | BELL | $B^{\pm} \to K^{\pm}\omega\phi$ |

[5] Reported B($B^{\pm} \to K^{\pm}X(1812)) \times$ B($X \to \omega\phi) < 3.2 \times 10^{-7}$ at 90% CL.

## X(1835) REFERENCES

| LIU | 09 | PR D79 071102R | C. Liu *et al.* | (BELLE Collab.) |
|---|---|---|---|---|
| WEI | 08 | PL B659 80 | J.-T. Wei *et al.* | (BELLE Collab.) |
| ABLIKIM | 06J | PRL 96 162002 | M. Ablikim *et al.* | (BES Collab.) |
| ATHAR | 06 | PR D73 032001 | S.B. Athar *et al.* | (CLEO Collab.) |
| ABLIKIM | 05R | PRL 95 262001 | M. Ablikim *et al.* | (BES Collab.) |
| AUBERT,B | 05L | PR D72 051101R | B. Aubert *et al.* | (BABAR Collab.) |
| SIBIRTSEV | 05A | PR D71 054010 | A. Sibirtsev, J. Haidenbauer | |
| WANG | 05A | PL B617 141 | M.-Z. Wang *et al.* | (BELLE Collab.) |
| BAI | 03F | PRL 91 022001 | J.Z. Bai *et al.* | (BES Collab.) |
| ABE | 02K | PRL 88 181803 | K. Abe *et al.* | (BELLE Collab.) |
| ABE | 02W | PRL 89 151802 | K. Abe *et al.* | (BELLE Collab.) |