$X(3872)$

$I^G(J^P) = ?^?(?^?)$

OMITTED FROM SUMMARY TABLE

Seen by CHOI 03 in $B \to K\pi^+\pi^- J/\psi(1S)$ decays as a narrow peak in the invariant mass distribution of the $\pi^+\pi^- J/\psi(1S)$ final state, but not seen in the $\gamma\chi_{c1}$ final state of these decays. Possibly absent in the invariant mass spectrum of the final state $\pi^+\pi^- J/\psi(1S)$ in e^+e^- collisions. Interpretation as a 1^{--} charmonium state not favored. Isovector hypothesis excluded by AUBERT 05B.

Quantum numbers are not established.

$X(3872)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
3871.7±0.6 OUR AVERAGE					
3871.3±0.7±0.4	730	[1] ACOSTA	04	CDF2	$p\overline{p} \to J/\psi\pi^+\pi^- X$
3872.0±0.6±0.5	36	CHOI	03	BELL	$B \to K\pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3871.8±3.1±3.0	522	[1,2] ABAZOV	04F	D0	$p\overline{p} \to J/\psi\pi^+\pi^- X$

[1] Width consistent with detector resolution.
[2] Calculated from the corresponding $m_{X(3872)} - m_{J/\psi}$ using $m_{J/\psi}$=3096.916 MeV.

$m_{X(3872)^\pm} - m_{J/\psi}$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
774.9±3.1±3.0	522	ABAZOV	04F	D0	$p\overline{p} \to J/\psi\pi^+\pi^- X$

$X(3872)$ WIDTH

VALUE (MeV)	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<2.3	90	36	CHOI	03	BELL	$B \to K\pi^+\pi^- J/\psi$

$X(3872)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	e^+e^-	
Γ_2	$\pi^+\pi^- J/\psi(1S)$	seen
Γ_3	$\gamma\gamma$	
Γ_4	$D^0\overline{D}^0$	not seen
Γ_5	D^+D^-	not seen
Γ_6	$D^0\overline{D}^0\pi^0$	not seen
Γ_7	$\gamma\chi_{c1}$	
Γ_8	$\eta J/\psi$	

$X(3872)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ — Γ_1

VALUE (keV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.28	90	[3] YUAN	04	RVUE	$e^+e^- \to \pi^+\pi^- J/\psi$

[3] Using BAI 98E data on $e^+e^- \to \pi^+\pi^-\ell^+\ell^-$. Assuming that $\Gamma(\pi^+\pi^- J/\psi)$ of $X(3872)$ is the same as that of $\psi(2S)$ (85.4 keV).

$X(3872)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(e^+e^-) \times \Gamma(\pi^+\pi^- J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_1\Gamma_2/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8.3	90	[4] DOBBS	05	CLE3	$e^+e^- \to \pi^+\pi^- J/\psi$
<10	90	[5] YUAN	04	RVUE	$e^+e^- \to \pi^+\pi^- J/\psi$

[4] Assuming $X(3872)$ has $J^{PC} = 1^{--}$.

[5] Using BAI 98E data on $e^+e^- \to \pi^+\pi^-\ell^+\ell^-$. From theoretical calculation of the production cross section and using $B(J/\psi \to \mu^+\mu^-) = (5.88 \pm 0.10)\%$.

$X(3872)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$\Gamma(\gamma\gamma) \times \Gamma(\pi^+\pi^- J/\psi(1S))/\Gamma_{\text{total}}$ — $\Gamma_3\Gamma_2/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<12.9	90	[6] DOBBS	05	CLE3	$e^+e^- \to \pi^+\pi^- J/\psi\gamma$

[6] Assuming $X(3872)$ has positive C parity and spin 0.

$X(3872)$ BRANCHING RATIOS

$\Gamma(\gamma\chi_{c1})/\Gamma(\pi^+\pi^- J/\psi(1S))$ — Γ_7/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.89	90	CHOI	03	BELL	$B \to K\pi^+\pi^- J/\psi$

$\Gamma(\eta J/\psi)/\Gamma(\pi^+\pi^- J/\psi(1S))$ — Γ_8/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.6	90	AUBERT	04Y	BABR	$B \to K\eta J/\psi$

$\Gamma(D^0\overline{D}^0)/\Gamma(\pi^+\pi^- J/\psi(1S))$ — Γ_4/Γ_2

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	CHISTOV	04	BELL	$B \to K D^0\overline{D}^0$

$\Gamma(D^+ D^-)/\Gamma(\pi^+\pi^- J/\psi(1S))$ — Γ_5/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	CHISTOV	04	BELL	$B \to K D^+ D^-$

$\Gamma(D^0 \overline{D}^0 \pi^0)/\Gamma(\pi^+\pi^- J/\psi(1S))$ — Γ_6/Γ_2

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	CHISTOV	04	BELL	$B \to K D^0 \overline{D}^0 \pi$

$X(3872)$ REFERENCES

AUBERT	05B	PR D71 031501	B. Aubert *et al.*	(BABAR Collab.)
DOBBS	05	PRL 94 032004	S. Dobbs *et al.*	(CLEO Collab.)
ABAZOV	04F	PRL 93 162002	V.M. Abazov *et al.*	(D0 Collab.)
ACOSTA	04	PRL 93 072001	D. Acosta *et al.*	(CDF Collab.)
AUBERT	04Y	PRL 93 041801	B. Aubert *et al.*	(BaBar Collab.)
CHISTOV	04	PRL 93 051803	R. Chistov *et al.*	(BELLE Collab.)
YUAN	04	PL B579 74	C.Z. Yuan *et al.*	
CHOI	03	PRL 91 262001	S.-K. Choi *et al.*	(BELLE Collab.)
BAI	98E	PR D57 3854	J.Z. Bai *et al.*	(BES Collab.)

OTHER RELATED PAPERS

BUGG	05	PR D71 016006	D. Bugg
KIM	05	PR D71 034025	T. Kim, P. Ko
LI	05	PL B605 306	B.A. Li
MAIANI	05	PR D71 014028	L. Maiani *et al.*
BARNES	04	PR D69 054008	T. Barnes, S. Godfrey
BRAATEN	04	PR D69 074005	E. Braaten *et al.*
BRAATEN	04A	PR D69 114012	E. Braaten, M. Kusunoki
BRAATEN	04B	PRL 93 162001	E. Braaten, M. Kusunoki, S. Nussinov
BUGG	04B	PL B598 8	D.V. Bugg
CLOSE	04	PL B578 119	F.E. Close, P.R. Page
EICHTEN	04	PR D69 094019	E. Eichten, K. Lane, C. Quigg
PAKVASA	04	PL B579 67	S. Pakvasa, M. Suzuki
ROSNER	04	PR D70 094023	J.L. Rosner
SWANSON	04A	PL B588 189	E. Swanson
SWANSON	04B	PL B598 197	E. Swanson
TORNQVIST	04	PL B590 209	N. Tornqvist
VOLOSHIN	04	PL B579 316	M.B. Voloshin
VOLOSHIN	04A	PL B604 69	M.B. Voloshin
WONG	04	PR C69 055202	C. Wong