$X(3900)$

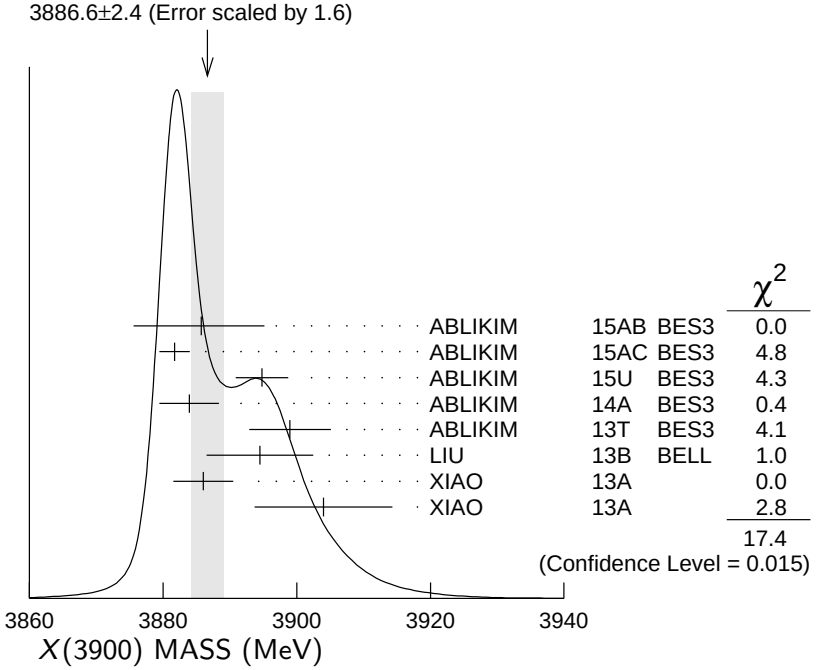
$I^G(J^{PC}) = 1^+(1^{+-})$

Charged $X(3900)$ seen as a peak in the invariant mass distribution of the $J/\psi\pi^\pm$ system by BES III (ABLIKIM 13T) in $e^+e^- \to \pi^+\pi^- J/\psi$ at c.m. energy of 4.26 GeV and by radiative return from e^+e^- collisions at $\sqrt{s}$ from 9.46 to 10.86 GeV at Belle (LIU 13B). Angular analysis of ABLIKIM 14A and ABLIKIM 15AC favor the $J^P = 1^+$ assignment. Neutral $X(3900)$ seen in the $J/\psi\pi^0$ invariant mass distribution in $e^+e^- \to \pi^0\pi^0 J/\psi$ at c.m. energies of 4.23, 4.26, and 4.36 GeV by BES III (ABLIKIM 15U) and at 4.17 GeV by XIAO 13A. Peaks in $(D\overline{D}^*)^{0,\pm}$ reported by BES III (ABLIKIM 14A, ABLIKIM 15AB) are assumed to be related.

$X(3900)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
3886.6±2.4 OUR AVERAGE		Error includes scale factor of 1.6. See the ideogram below.				
$3885.7^{+4.3}_{-5.7}\pm8.4$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$
$3881.7\pm1.6\pm1.6$	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
$3894.8\pm2.3\pm3.2$	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
$3883.9\pm1.5\pm4.2$	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
$3899.0\pm3.6\pm4.9$	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
$3894.5\pm6.6\pm4.5$	159	[1] LIU	13B	BELL	±	$e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$3886 \pm4 \pm2$	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \to \pi^+\pi^- J/\psi$
$3904 \pm9 \pm5$	25	[1,2] XIAO	13A		0	4.17 $e^+e^- \to \pi^0\pi^0 J/\psi$

[1] Neglecting interference between the $X(3900)$ and non-resonant continuum.
[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.



X(3900) WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
28.1± 2.6 OUR AVERAGE						
$35\ ^{+11}_{-12}\ \pm 15$		[1] ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$
26.6± 2.0± 2.1	1248	[1] ABLIKIM	15AC	BES3	±	$e^+e^- \to \pi^\pm(D\overline{D}^*)^\mp$
29.6± 8.2± 8.2	356	[1] ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
24.8± 3.3±11.0	1212	[1] ABLIKIM	14A	BES3	±	$e^+e^- \to \pi^\pm (D\overline{D}^*)^\mp$
46 ±10 ±20	307	[1] ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
63 ±24 ±26	159	[1] LIU	13B	BELL	±	$e^+e^- \to \gamma\pi^+\pi^- J/\psi$
37 ± 4 ± 8	81	[1,2] XIAO	13A		±	4.17 $e^+e^- \to \pi^+\pi^- J/\psi$

[1] Neglecting interference between the X(3900) and non-resonant continuum.
[2] For $M^2(\pi^+\pi^-) < 0.65$ GeV^2. Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.

X(3900) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$J/\psi\pi$	seen
Γ_2	$h_c\pi^\pm$	not seen
Γ_3	$\eta_c\pi^+\pi^-$	not seen
Γ_4	$(D\overline{D}^*)^\pm$	seen
Γ_5	D^0D^{*-} + c.c.	seen
Γ_6	D^-D^{*0} + c.c.	seen
Γ_7	$\omega\pi^\pm$	not seen
Γ_8	$J/\psi\eta$	not seen
Γ_9	D^+D^{*-} + c.c	seen
Γ_{10}	$D^0\overline{D}^{*0}$ + c.c	seen

X(3900) BRANCHING RATIOS

$\Gamma(J/\psi\pi)/\Gamma_{total}$ Γ_1/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
seen		356	ABLIKIM	15U	BES3	0	$e^+e^- \to \pi^0\pi^0 J/\psi$
seen		307	ABLIKIM	13T	BES3	±	$e^+e^- \to \pi^+\pi^- J/\psi$
seen		25	[1] XIAO	13A		0	4.17 $e^+e^- \to \pi^0\pi^0 J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
not seen	90		[2] ADOLPH	15D	COMP	±	$\gamma N \to J/\psi\pi^\pm N$

[1] Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration.
[2] ADOLPH 15D measure $B(X(3900)^\pm \to J/\psi\pi^\pm)\ \sigma(\gamma N \to X(3900)^\pm N)/\sigma(\gamma N \to J/\psi N) < 3.7\times10^{-3}$ at 90% CL.

$\Gamma(h_c\pi^\pm)/\Gamma_{total}$ Γ_2/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
not seen	ABLIKIM	13X	BES3	$\pm$	$e^+e^- \to h_c\pi^+\pi^-$

$\Gamma(\eta_c\pi^+\pi^-)/\Gamma_{total}$ Γ_3/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
not seen	[1] VINOKUROVA 15		BELL	0	$B^+ \to K^+\eta_c\pi^+\pi^-$

[1] VINOKUROVA 15 reports $B(B^+ \to K^+X(3900)^0) \times B(X \to \eta_c\pi^+\pi^-) < 4.7 \times 10^{-5}$ at 90% CL.

$\Gamma((D\overline{D}^*)^\pm)/\Gamma(J/\psi\pi)$ Γ_4/Γ_1

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
6.2±1.1±2.7	[1] ABLIKIM	14A	BES3	$\pm$	$e^+e^- \to \pi^\pm (D\overline{D}^*)^\mp$

[1] Assuming the same origin of the $(D\overline{D}^*)^\pm$ and $\pi^\pm J/\psi$ decay modes.

$\Gamma(D^0D^{*-}+\text{c.c.})/\Gamma_{total}$ Γ_5/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	ABLIKIM	15AC	BES3	$\pm$	$e^+e^- \to \pi^+D^0D^{*-}$ + c.c.
seen	ABLIKIM	14A	BES3	$\pm$	$e^+e^- \to \pi^+D^0D^{*-}$ + c.c.

$\Gamma(D^-D^{*0}+\text{c.c.})/\Gamma_{total}$ Γ_6/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	ABLIKIM	15AC	BES3	$\pm$	$e^+e^- \to \pi^+D^-D^{*0}$ + c.c.
seen	ABLIKIM	14A	BES3	$\pm$	$e^+e^- \to \pi^+D^-D^{*0}$ + c.c.

$\Gamma(\omega\pi^\pm)/\Gamma_{total}$ Γ_7/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
not seen	ABLIKIM	15R	BES3	$\pm$	$e^+e^- \to \omega\pi^+\pi^-$

$\Gamma(J/\psi\eta)/\Gamma_{total}$ Γ_8/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
not seen	ABLIKIM	15Q	BES3	0	4.0–4.6 $e^+e^- \to J/\psi\eta\pi^0$

$\Gamma(J/\psi\eta)/\Gamma(J/\psi\pi)$ Γ_8/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	CHG	COMMENT
<0.15	90	ABLIKIM	15Q	BES3	0	4.226 $e^+e^- \to J/\psi\eta\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<0.65	90	ABLIKIM	15Q	BES3	0	4.257 $e^+e^- \to J/\psi\eta\pi^0$

$\Gamma(D^+D^{*-}+\text{c.c})/\Gamma_{total}$ Γ_9/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$

$\Gamma(D^0\overline{D}^{*0}+\text{c.c})/\Gamma_{total}$ Γ_{10}/Γ

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
seen	ABLIKIM	15AB	BES3	0	$e^+e^- \to \pi^0(D\overline{D}^*)^0$

$\Gamma(D^+ D^{*-} + \text{c.c})/\Gamma(D^0 \overline{D}^{*0} + \text{c.c})$ **Γ_9/Γ_{10}**

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.96±0.18±0.12	ABLIKIM	15AB	BES3	0	$e^+ e^- \to \pi^0 (D\overline{D}^*)^0$

X(3900) REFERENCES

ABLIKIM	15AB	PRL 115 222002	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	15AC	PR D92 092006	M. Ablikim *et al.*	(BES III Collab.) JP
ABLIKIM	15Q	PR D92 012008	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	15R	PR D92 032009	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	15U	PRL 115 112003	M. Ablikim *et al.*	(BES III Collab.)
ADOLPH	15D	PL B742 330	C. Adolph *et al.*	(COMPASS Collab.)
VINOKUROVA	15	JHEP 1506 132	A. Vinokurova *et al.*	(BELLE Collab.)
ABLIKIM	14A	PRL 112 022001	M. Ablikim *et al.*	(BES III Collab.) JP
ABLIKIM	13T	PRL 110 252001	M. Ablikim *et al.*	(BES III Collab.)
ABLIKIM	13X	PRL 111 242001	M. Ablikim *et al.*	(BES III Collab.)
LIU	13B	PRL 110 252002	Z.Q. Liu *et al.*	(BELLE Collab.)
XIAO	13A	PL B727 366	T. Xiao *et al.*	(NWES)