$X(4260)$

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

Seen in radiative return from e^+e^- collisions at $\sqrt{s} = 9.54$–10.58 GeV by AUBERT,B 05I, HE 06B, and YUAN 07, and in e^+e^- collisions at $\sqrt{s} \approx 4.26$ GeV by COAN 06. Possibly seen by AUBERT 06 in $B^- \to K^-\pi^+\pi^- J/\psi$. See also the mini-review under the $X(3872)$. (See the index for the page number.)

$X(4260)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$4263^{+\ 8}_{-\ 9}$ OUR AVERAGE		Error includes scale factor of 1.1.			
$4247 \pm 12^{+17}_{-32}$		[1] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$4284^{+17}_{-16} \pm 4$	13.6	HE	06B	CLEO	9.4–10.6 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$4259 \pm 8^{+\ 2}_{-\ 6}$	125	[2] AUBERT,B	05I	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$

[1] From a two-resonance fit.
[2] From a single-resonance fit. Two interfering resonances are not excluded.

$X(4260)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
95 ± 14 OUR AVERAGE					
$108 \pm 19 \pm 10$		[3] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$73^{+39}_{-25} \pm 5$	13.6	HE	06B	CLEO	9.4–10.6 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$88 \pm 23^{+\ 6}_{-\ 4}$	125	[4] AUBERT,B	05I	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$

[3] From a two-resonance fit.
[4] From a single-resonance fit. Two interfering resonances are not excluded.

$X(4260)$ DECAY MODES

Due to the complexity of the $c\overline{c}$ threshold region, in this listing, "seen" ("not seen") means that a cross section for the mode in question has been measured at effective $\sqrt{s}$ near this particle's central mass value, more (less) than 2σ above zero, without regard to any peaking behavior in $\sqrt{s}$ or absence thereof. See mode listing(s) for details and references.

	Mode	Fraction (Γ_i/Γ)
Γ_1	e^+e^-	
Γ_2	$J/\psi\pi^+\pi^-$	seen
Γ_3	$J/\psi\pi^0\pi^0$	seen
Γ_4	$J/\psi K^+K^-$	seen
Γ_5	$J/\psi\eta$	not seen
Γ_6	$J/\psi\pi^0$	not seen

Γ_7	$J/\psi\eta'$	not seen
Γ_8	$J/\psi\pi^+\pi^-\pi^0$	not seen
Γ_9	$J/\psi\eta\eta$	not seen
Γ_{10}	$\psi(2S)\pi^+\pi^-$	not seen
Γ_{11}	$\psi(2S)\eta$	not seen
Γ_{12}	$\chi_{c0}\omega$	not seen
Γ_{13}	$\chi_{c1}\gamma$	not seen
Γ_{14}	$\chi_{c2}\gamma$	not seen
Γ_{15}	$\chi_{c1}\pi^+\pi^-\pi^0$	not seen
Γ_{16}	$\chi_{c2}\pi^+\pi^-\pi^0$	not seen
Γ_{17}	$\phi\pi^+\pi^-$	not seen
Γ_{18}	$\quad\phi f_0(980) \rightarrow\ \phi\pi^+\pi^-$	not seen
Γ_{19}	$D\overline{D}$	not seen
Γ_{20}	$\quad D^0\overline{D}^0$	seen
Γ_{21}	$\quad D^+D^-$	seen
Γ_{22}	$D^*\overline{D}+$c.c.	seen
Γ_{23}	$\quad D^*(2007)^0\overline{D}^0+$c.c.	seen
Γ_{24}	$\quad D^*(2010)^+D^-+$c.c.	seen
Γ_{25}	$D^*\overline{D}^*$	not seen
Γ_{26}	$\quad D^*(2007)^0\overline{D}^*(2007)^0$	seen
Γ_{27}	$\quad D^*(2010)^+D^*(2010)^-$	seen
Γ_{28}	$D\overline{D}\pi+$c.c.	
Γ_{29}	$\quad D^0D^-\pi^++$c.c. (excl. $D^*(2007)^0\overline{D}^{*0}+$c.c., $D^*(2010)^+D^-+$c.c.)	not seen
Γ_{30}	$D\overline{D}^*\pi+$c.c. (excl. $D^*\overline{D}^*$)	seen
Γ_{31}	$D^0D^{*-}\pi^++$c.c. (excl. $D^*(2010)^+D^*(2010)^-$)	not seen
Γ_{32}	$\quad D^0D^*(2010)^-\pi^++$c.c.	not seen
Γ_{33}	$D^*\overline{D}^*\pi$	seen
Γ_{34}	$D_s^+D_s^-$	seen
Γ_{35}	$D_s^{*+}D_s^-+$c.c.	seen
Γ_{36}	$D_s^{*+}D_s^{*-}$	seen
Γ_{37}	$p\overline{p}$	not seen
Γ_{38}	$K_S^0K^\pm\pi^\mp$	not seen
Γ_{39}	$K^+K^-\pi^0$	not seen

$X(4260)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

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

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
$5.9^{+1.2}_{-0.9}$ OUR AVERAGE					
$6.0\pm1.2^{+4.7}_{-0.5}$		[5] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$8.9^{+3.9}_{-3.1}\pm1.8$	8.1	HE	06B	CLEO	9.4–10.6 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
$5.5\pm1.0^{+0.8}_{-0.7}$	125	[6] AUBERT,B	05I	BABR	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$20.6\pm2.3^{+9.1}_{-1.7}$		[7] YUAN	07	BELL	10.58 $e^+e^- \to \gamma\pi^+\pi^- J/\psi$

[5] Solution I of two equivalent solutions in a fit using two interfering resonances.
[6] From a single-resonance fit. Two interfering resonances are not excluded.
[7] Solution II of two equivalent solutions in a fit using two interfering resonances.

$\Gamma(J/\psi K^+K^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_4\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.2	90	[8] YUAN	08	BELL	$e^+e^- \to \gamma K^+K^- J/\psi$

[8] From a fit of the broad $K^+K^- J/\psi$ enhancement including a coherent $X(4260)$ amplitude with mass and width from YUAN 07.

$\Gamma(\psi(2S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{10}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.3	90	[9] LIU	08H	RVUE	10.58 $e^+e^- \to \psi(2S)\pi^+\pi^-\gamma$
$7.4^{+2.1}_{-1.7}$		[10] LIU	08H	RVUE	10.58 $e^+e^- \to \psi(2S)\pi^+\pi^-\gamma$

[9] For constructive interference with the $X(4360)$ in a combined fit of AUBERT 07S and WANG 07D data with three resonances.
[10] For destructive interference with the $X(4360)$ in a combined fit of AUBERT 07S and WANG 07D data with three resonances.

$\Gamma(\phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{17}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<0.4	90	AUBERT,BE	06D	BABR	10.6 $e^+e^- \to K^+K^-\pi^+\pi^-\gamma$

$\Gamma(\phi f_0(980) \to \phi\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{18}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<0.29	90	[11] AUBERT	07AK	BABR	10.6 $e^+e^- \to \pi^+\pi^-K^+K^-\gamma$

[11] AUBERT 07AK reports $[\Gamma(X(4260) \to \phi f_0(980) \to \phi\pi^+\pi^-) \times \Gamma(X(4260) \to e^+e^-)/\Gamma_{\text{total}}] \times [B(\phi(1020) \to K^+K^-)] <$ 0.14 eV which we divide by our best value $B(\phi(1020) \to K^+K^-) = 48.9 \times 10^{-2}$.

$\Gamma(K^0_S K^\pm \pi^\mp) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{38}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.5	90	AUBERT	08S	BABR	10.6 $e^+e^- \to K^0_S K^\pm \pi^\mp \gamma$

$\Gamma(K^+ K^- \pi^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{39}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.6	90	AUBERT	08S	BABR	10.6 $e^+e^- \to K^+ K^- \pi^0 \gamma$

$X(4260)$ BRANCHING RATIOS

$\Gamma(D^0\overline{D}^0)/\Gamma_{total}$ Γ_{20}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^0\overline{D}^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AUBERT	09M	BABR	$e^+e^- \to D^0\overline{D}^0\gamma$
not seen	PAKHLOVA	08	BELL	$e^+e^- \to D^0\overline{D}^0\gamma$

$\Gamma(D^+ D^-)/\Gamma_{total}$ Γ_{21}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^+ D^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AUBERT	09M	BABR	$e^+e^- \to D^+ D^-\gamma$
not seen	PAKHLOVA	08	BELL	$e^+e^- \to D^+ D^-\gamma$

$\Gamma(D^*(2007)^0\overline{D}^0 + \text{c.c.})/\Gamma_{total}$ Γ_{23}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^{*0}\overline{D}^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AUBERT	09M	BABR	$e^+e^- \to D^{*0}\overline{D}^0\gamma$

$\Gamma(D^*(2010)^+ D^- + \text{c.c.})/\Gamma_{total}$ Γ_{24}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^{*+} D^-$
seen	PAKHLOVA	07	BELL	$e^+e^- \to D^{*+} D^-\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AUBERT	09M	BABR	$e^+e^- \to D^{*+} D^-\gamma$

$\Gamma(D^0 D^-\pi^+ + \text{c.c. (excl. } D^*(2007)^0\overline{D}^{*0} + \text{c.c., } D^*(2010)^+ D^- + \text{c.c.}))/\Gamma_{total}$ Γ_{29}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	PAKHLOVA	08A	BELL	10.6 $e^+e^- \to D^0 D^-\pi^+\gamma$

$\Gamma(D\overline{D})/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{19}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.0	90	[12] AUBERT	07BE	BABR	$e^+e^- \to D\overline{D}\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.0	90	CRONIN-HEN..	09	CLEO	e^+e^-

[12] Using 4259 ± 10 MeV for the mass and 88 ± 24 MeV for the width of $X(4260)$.

$\Gamma(D^0 D^*(2010)^-\pi^+ + \text{c.c.})/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{32}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<9	90	PAKHLOVA	09	BELL	$e^+e^- \to D^0 D^{*-}\pi^+$

$\Gamma(D^0 D^*(2010)^-\pi^+ + \text{c.c.})/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_{32}/\Gamma \times \Gamma_1/\Gamma$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<0.42 \times 10^{-6}$	90	[13] PAKHLOVA	09	BELL	$e^+e^- \to D^0 D^{*-}\pi^+$

[13] Using 4263^{+8}_{-9} MeV for the mass of $X(4260)$.

$\Gamma(D^*\overline{D} + \text{c.c.})/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{22}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<34	90	AUBERT	09M	BABR	$e^+e^- \to \gamma D^*\overline{D}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<45	90	CRONIN-HEN..	09	CLEO	e^+e^-

$\Gamma(D^*(2007)^0\overline{D}^*(2007)^0)/\Gamma_{\text{total}}$ Γ_{26}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..	09	CLEO	$e^+e^- \to D^{*0}\overline{D}^{*0}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AUBERT	09M	BABR	$e^+e^- \to D^{*0}\overline{D}^{*0}\gamma$

$\Gamma(D^*(2010)^+ D^*(2010)^-)/\Gamma_{\text{total}}$ Γ_{27}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..	09	CLEO	$e^+e^- \to D^{*+}D^{*-}$
seen	PAKHLOVA	07	BELL	$e^+e^- \to D^{*+}D^{*-}\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	AUBERT	09M	BABR	$e^+e^- \to D^{*+}D^{*-}\gamma$

$\Gamma(D^*\overline{D}^*)/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{25}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<11	90	CRONIN-HEN..	09	CLEO	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<40	90	AUBERT	09M	BABR	$e^+e^- \to \gamma D^*\overline{D}^*$

$\Gamma(D\overline{D}^*\pi + \text{c.c. (excl. } D^*\overline{D}^*))/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{30}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<15	90	CRONIN-HEN..	09	CLEO	e^+e^-

$\Gamma(D^*\overline{D}^*\pi)/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{33}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8.2	90	CRONIN-HEN..09		CLEO	e^+e^-

$\Gamma(D_s^+ D_s^-)/\Gamma_{\text{total}}$ Γ_{34}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	DEL-AMO-SA..10N		BABR	$e^+e^- \to D_s^+ D_s^- \gamma$
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D_s^+ D_s^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	PAKHLOVA	11	BELL	$e^+e^- \to D_s^+ D_s^- \gamma$

$\Gamma(D_s^+ D_s^-)/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{34}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.7	95	DEL-AMO-SA..10N		BABR	10.6 e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.3	90	CRONIN-HEN..09		CLEO	e^+e^-

$\Gamma(D_s^{*+} D_s^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{35}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	DEL-AMO-SA..10N		BABR	$e^+e^- \to D_s^{*+} D_s^- \gamma$
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D_s^{*+} D_s^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	PAKHLOVA	11	BELL	$e^+e^- \to D_s^{*+} D_s^- \gamma$

$\Gamma(D_s^{*+} D_s^- + \text{c.c.})/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{35}/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 0.8	90	CRONIN-HEN..09		CLEO	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<44	95	DEL-AMO-SA..10N		BABR	10.6 e^+e^-

$\Gamma(D_s^{*+} D_s^{*-})/\Gamma_{\text{total}}$ Γ_{36}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D_s^{*+} D_s^{*-}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	PAKHLOVA	11	BELL	$e^+e^- \to D_s^{*+} D_s^{*-} \gamma$
not seen	DEL-AMO-SA..10N		BABR	$e^+e^- \to D_s^{*+} D_s^{*-} \gamma$

$\Gamma(D\overline{D}^*\pi + \text{c.c. (excl. } D^*\overline{D}^*))/\Gamma_{\text{total}}$ Γ_{30}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^*\overline{D}\pi$

$\Gamma(D^0 D^{*-}\pi^+ + \text{c.c. (excl. } D^*(2010)^+ D^*(2010)^-))/\Gamma_{\text{total}}$ Γ_{31}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	PAKHLOVA	09	BELL	$e^+e^- \to D^0 D^{*-}\pi^+\gamma$

$\Gamma(D^*\overline{D}^*\pi)/\Gamma_{total}$ Γ_{33}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
seen	CRONIN-HEN..09	CLEO	$e^+e^- \rightarrow D^*\overline{D}^*\pi$

$\Gamma(D_s^{*+}D_s^{*-})/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{36}/Γ_2

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 9.5	90	CRONIN-HEN..09	CLEO	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<30	95	DEL-AMO-SA..10N	BABR	10.6 e^+e^-

$\Gamma(p\overline{p})/\Gamma(J/\psi\pi^+\pi^-)$ Γ_{37}/Γ_2

VALUE	CL%	DOCUMENT ID		COMMENT
<0.13	90	[14] AUBERT	06B	$e^+e^- \rightarrow p\overline{p}\gamma$

[14] Using 4259 ± 10 MeV for the mass and 88 ± 24 MeV for the width of $X(4260)$.

$X(4260)$ REFERENCES

PAKHLOVA	11	PR D83 011101	G. Pakhlova *et al.*	(BELLE Collab.)
DEL-AMO-SA...	10N	PR D82 052004	P. del Amo Sanchez *et al.*	(BABAR Collab.)
AUBERT	09M	PR D79 092001	B. Aubert *et al.*	(BABAR Collab.)
CRONIN-HEN...	09	PR D80 072001	D. Cronin-Hennessy *et al.*	(CLEO Collab.)
PAKHLOVA	09	PR D80 091101R	G. Pakhlova *et al.*	(BELLE Collab.)
AUBERT	08S	PR D77 092002	B. Aubert *et al.*	(BABAR Collab.)
LIU	08H	PR D78 014032	Z.Q. Liu, X.S. Qin, C.Z. Yuan	
PAKHLOVA	08	PR D77 011103R	G. Pakhlova *et al.*	(BELLE Collab.)
PAKHLOVA	08A	PRL 100 062001	G. Pakhlova *et al.*	(BELLE Collab.)
YUAN	08	PR D77 011105R	C.Z. Yuan *et al.*	(BELLE Collab.)
AUBERT	07AK	PR D76 012008	B. Aubert *et al.*	(BABAR Collab.)
AUBERT	07BE	PR D76 111105R	B. Aubert *et al.*	(BABAR Collab.)
AUBERT	07S	PRL 98 212001	B. Aubert *et al.*	(BABAR Collab.)
PAKHLOVA	07	PRL 98 092001	G. Pakhlova *et al.*	(BELLE Collab.)
WANG	07D	PRL 99 142002	X.L. Wang *et al.*	(BELLE Collab.)
YUAN	07	PRL 99 182004	C.Z. Yuan *et al.*	(BELLE Collab.)
AUBERT	06	PR D73 011101R	B. Aubert *et al.*	(BABAR Collab.)
AUBERT	06B	PR D73 012005	B. Aubert *et al.*	(BABAR Collab.)
AUBERT,BE	06D	PR D74 091103R	B. Aubert *et al.*	(BABAR Collab.)
COAN	06	PRL 96 162003	T.E. Coan *et al.*	(CLEO Collab.)
HE	06B	PR D74 091104R	Q. He *et al.*	(CLEO Collab.)
AUBERT,B	05I	PRL 95 142001	B. Aubert *et al.*	(BABAR Collab.)