$$\psi$$
(4660)

$$I^{G}(J^{PC}) = 0^{-}(1^{-})$$

also known as Y(4660); was X(4660)See the reviews on the "Spectroscopy of Mesons Containing two Heavy Quarks" and on "Heavy Non-qqbar Mesons."

ψ (4660) MASS

VALUE	(MeV)		1	EVTS		DOCUMENT IL)	TECN	COMMENT
4623	±10	0	UR AVE	RAGE		Error includes	s scale	factor	of 3.7. See the ideogram below.
4603.1	$1\pm$ 3.9	9±	0.8		1	ABLIKIM	24BN	BES3	$e^+e^- \rightarrow D_s^+ D_{s2}^* (2573)^-$
4584	± 14	±٤	30		2	ABLIKIM	24BN	BES3	$e^+e^- \rightarrow D_s^+ D_{s1}(2536)^-$
4708	$^{+17}_{-15}$	± 2	21		3	ABLIKIM	23BI	BES3	$e^+e^- \rightarrow K^+K^-J/\psi$
4701.8	8 ± 10.9)±	2.7		4	ABLIKIM	23н	BES3	$e^+e^- \rightarrow \phi \chi_{c2}$
4675.3	3 ± 29.5	$5\pm$	3.5		5	ABLIKIM	23X	BES3	$e^+e^- \to D^{*0}D^{*-}\pi^+$
4651.0	0 ± 37.8	3±	2.1		6	ABLIKIM	21AJ	BES3	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
4619.8	$8^+ 8.9^- 8.0$	3^{\pm}	2.3	66	7	JIA	20	BELL	$e^+e^- \rightarrow \gamma D_s^+ D_{s2}^* (2573)^-$
4625.9	9^+ 6.2 - 6.0	$\frac{2}{5}\pm$	0.4	89	8	JIA	19A	BELL	$e^+e^- \rightarrow \gamma D_s^+ D_{s1}(2536)^-$
4652	± 10	± 1	11	279	9	WANG	15A	BELL	$10.58 e^+ e^- \rightarrow \\ \sim \pi^+ \pi^- \sqrt{2}$
4669	± 21	±	3	37	10	LEES	14F	BABR	$10.58 e^+ e^- \rightarrow \gamma \pi^+ \pi^- \psi(2S)$
4634	$^{+}_{-}$ $^{8}_{7}$	$^+$	5 8	142	11	PAKHLOVA	08 B	BELL	$e^+e^- \rightarrow \Lambda^+_c \Lambda^c$
• • •	We do	o no	t use th	e follo	wi	ng data for av	erage	s, fits, li	mits, etc. • • •
4647.9	9± 8.6	δ±	0.8		12	ABLIKIM	22R	BES3	$e^+e^- \rightarrow \pi^+\pi^-\chi_{c1}\gamma$
4652.5	$5\pm$ 3.4	ł±	1.1		13	DAI	17	RVUE	$e^+e^- \rightarrow \Lambda_c^+\Lambda_c^-$
4645.2	2± 9.5	$5\pm$	6.0		14	ZHANG	17 B	RVUE	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
4646.4	4± 9.7	7±	4.8		15	ZHANG	17C	RVUE	$e^+e^- ightarrow \pi^+\pi^- J/\psi$ or $\psi(2S)$
4661	$^{+}$ 9 $^{-}$ 8	±	6	44	16	LIU	08H	RVUE	$\begin{array}{c} 10.58 \ e^+ e^- \rightarrow \\ \gamma \pi^+ \pi^- \psi(2S) \end{array}$
4664	± 11	±	5	44		WANG	07 D	BELL	$10.58 \ e^+ e^- \rightarrow \gamma \pi^+ \pi^- \psi(2S)$

 1 Extracted in a fit that employs two BW resonances. The second one at about 4720 MeV shows low statistical significance of 2.7 $\sigma.$

- ² Extracted from a fit with two BW functions. The second one located at about 4750 MeV show a low statistical significance of 4.3 σ .
- ³Seen as a peak in the c.m. energy dependence of the $e^+e^- \rightarrow K^+K^-J/\psi$ cross section using 5.85 fb⁻¹ of data at c.m. energies 4.61–4.95 GeV. Statistical significance is over 5σ .
- ⁴ Fit model parameterized as the coherent sum of a Breit-Wigner resonance and a continuum amplitude term.
- ⁵ From a cross-section measurement of $e^+e^- \rightarrow D^{*0}D^{*-}\pi^+$ between 4.189 and 4.951 GeV, assuming a coherent sum of 3 Breit-Wigner resonances plus a continuum amplitude. The two other resonances have masses (widths) 4209.6 ± 7.5 (81.6 ± 19.9) MeV and 4469.1 ± 26.4 (246.3 ± 37.9) MeV.

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⁶ From a three-resonance fit to the Born cross section in the range \sqrt{s} = 4.008–4.698 GeV. ⁷ Using $D_{s2}^*(2573)^- \rightarrow \overline{D}{}^0 K^-$ decays.

⁸ From a fit of a Breit-Wigner convolved with a Gaussian.

 9 From a two-resonance fit. Supersedes WANG 07D.

¹⁰ From a two-resonance fit. ¹¹ The $\pi^+\pi^-\psi(2S)$ and $\Lambda_c^+\Lambda_c^-$ states are not necessarily the same. ¹² From a fit to the $e^+e^- \rightarrow \pi^+\pi^-\psi(3823)$ cross section between 4.23 and 4.70 GeV with two coherent Breit-Wigner resonances. The data is also consistent with a single peak with mass 4417.5 \pm 26.2 \pm 3.5 MeV and width 245 \pm 48 \pm 13 MeV.

 $^{13}\,\mathrm{The}$ pole parameters are extracted from the speed plot.

¹⁴ From a three-resonance fit. ¹⁵ From a combined fit of BELLE, BABAR and BES3 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$ and $e^+e^- \rightarrow$ $\pi^+\pi^-\psi(2S)$ data.

¹⁶ From a combined fit of AUBERT 07S and WANG 07D data with two resonances.



ψ (4660) WIDTH

VALUE (MeV) EVTS	DOCUMENT ID	TECN	COMMENT
55 \pm 9 OUR AVERAGE	Error includes	scale factor o	f 1.9. See the ideogram below.
57 ± 12 ± 219	1 ABLIKIM	24BN BES3	$e^+e^- \rightarrow D_s^+ D_{s1}(2536)^-$
$45.2\pm~5.7\pm~0.7$	² ABLIKIM	24BN BES3	$e^+e^- \rightarrow D_s^+ D_{s2}^* (2573)^-$
$126 \begin{array}{r} +27\\ -23\end{array} \pm 30$	³ ABLIKIM	23BI BES3	$e^+e^- \rightarrow K^+K^-J/\psi$
$30.5 \pm 22.3 \pm 14.6$	⁴ ABLIKIM	23H BES3	$e^+e^- \rightarrow \phi \chi_{c2}$
$218.3 \pm 72.9 \pm 9.3$	⁵ ABLIKIM	23X BES3	$e^+e^- \rightarrow D^{*0}D^{*-}\pi^+$
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155.4	4±24.8	8±	0.8		⁶ ABLIKIM	21AJ	BES3	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
47.0	$0^{+31.3}_{-14.8}$	3 8±	4.6	66	⁷ JIA	20	BELL	$e^+e^- \rightarrow \gamma D_s^+ D_{s2}^* (2573)^-$
49.8	$8^{+13.9}_{-11.5}$	9 5 ±	4.0	89	⁸ JIA	19A	BELL	$e^+e^- \rightarrow \gamma D_s^+ D_{s1}(2536)^-$
68	± 11	±	5	279	⁹ WANG	15A	BELL	10.58 $e^+e^- \rightarrow$
104	\pm 48	±	10	37	¹⁰ LEES	14F	BABR	$\gamma \pi^{+} \pi^{-} \psi(2S)$ 10.58 e ⁺ e ⁻ \rightarrow $\gamma \pi^{+} \pi^{-} \psi(2S)$
92	$^{+40}_{-24}$	+	10 21	142	¹¹ PAKHLOVA	08 B	BELL	$e^+e^- \rightarrow \Lambda_c^+ \Lambda_c^-$
• •	• We d	do n	ot use	the follo	owing data for av	/erage	s, fits, li	mits, etc. • • •
33.	1 ± 18.6	б±	4.1		¹² ABLIKIM	22R	BES3	$e^+e^- \rightarrow \pi^+\pi^-\chi_{c1}\gamma$
62.0	6± 5.6	6±	4.3		¹³ DAI	17	RVUE	$e^+e^- \rightarrow \Lambda_c^+\Lambda_c^-$
113.8	8 ± 18.2	$1\pm$	3.4		¹⁴ ZHANG	17 B	RVUE	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
103.	5 ± 15.6	б±	4.0		¹⁵ ZHANG	17C	RVUE	$e^+e^- \rightarrow \pi^+\pi^- J/\psi$ or $\psi(2S)$
42	$^{+17}_{-12}$	±	6	44	¹⁶ LIU	08н	RVUE	$10.58 \ e^+ e^- \rightarrow \gamma \pi^+ \pi^- \psi(2S)$
48	± 15	±	3	44	WANG	07 D	BELL	$10.58 \ e^+ e^- \rightarrow \gamma \pi^+ \pi^- \psi(2S)$

 1 Extracted from a fit with two BW functions. The second one located at about 4750 MeV show a low statistical significance of 4.3 $\sigma.$

 2 Extracted in a fit that employs two BW resonances. The second one at about 4720 MeV shows low statistical significance of 2.7 σ .

³Seen as a peak in the c.m. energy dependence of the $e^+e^- \rightarrow K^+K^-J/\psi$ cross section using 5.85 fb⁻¹ of data at c.m. energies 4.61–4.95 GeV. Statistical significance is over 5σ .

⁴ Fit model parameterized as the coherent sum of a Breit-Wigner resonance and a continuum amplitude term.

⁵ From a cross-section measurement of $e^+e^- \rightarrow D^{*0}D^{*-}\pi^+$ between 4.189 and 4.951 GeV, assuming a coherent sum of 3 Breit-Wigner resonances plus a continuum amplitude. The two other resonances have masses (widths) 4209.6 ± 7.5 (81.6 ± 19.9) MeV and 4469.1 ± 26.4 (246.3 ± 37.9) MeV.

⁶ From a three-resonance fit to the Born cross section in the range $\sqrt{s} = 4.008-4.698$ GeV.

^{*i*} Using
$$D^*_{s2}(2573)^- \rightarrow \overline{D}{}^0 K^-$$
 decays.

 8 From a fit of a Breit-Wigner convolved with a Gaussian.

⁹ From a two-resonance fit. Supersedes WANG 07D.

¹¹ The $\pi^+\pi^-\psi(2S)$ and $\Lambda^+_c\Lambda^-_c$ states are not necessarily the same.

- ¹² From a fit to the $e^+e^- \rightarrow \pi^+\pi^-\psi(3823)$ cross section between 4.23 and 4.70 GeV with two coherent Breit-Wigner resonances. The data is also consistent with a single peak with mass 4417.5 \pm 26.2 \pm 3.5 MeV and width 245 \pm 48 \pm 13 MeV.
- 13 The pole parameters are extracted from the speed plot.
- 14 From a three-resonance fit.

¹⁵ From a combined fit of BELLE, BABAR and BES3 $e^+e^- \rightarrow \pi^+\pi^- J/\psi$ and $e^+e^- \rightarrow \pi^+\pi^- \psi(2S)$ data.

 16 From a combined fit of AUBERT 07S and WANG 07D data with two resonances.



ψ (4660) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$e^{+}e^{-}$	not seen
Γ2	$\psi(2S)\pi^+\pi^-$	seen
Γ ₃	$J/\psi \eta$	not seen
Γ ₄	$D^0 D^{*-} \pi^+$	not seen
Γ ₅	$D^{*0}D^{*-}\pi^+$	seen
Г ₆	$\psi_2(3823)\pi^+\pi^-$	seen
Γ ₇	$\chi_{c1}\gamma$	not seen
Г ₈	$\chi_{c1}\phi$	not seen
Γ9	$\chi_{c2}\gamma$	not seen
Γ ₁₀	$\chi_{c2}\phi$	not seen
Γ_{11}	$\Lambda_c^+ \Lambda_c^-$	seen
Γ ₁₂	$D_s^+ D_{s1}(2536)^-$	seen
Γ ₁₃	$D_{s}^{+}D_{s2}^{*}(2573)^{-}$	seen
Γ_{14}	$\omega \pi^0$	not seen
Γ ₁₅	$\omega \eta$	not seen
Γ ₁₆	$\Sigma^+ \overline{\Sigma}^-$	not seen
Γ_{17}	$\equiv^0 \overline{\equiv}^0$	
Γ ₁₈	<u>=</u> - <u>=</u> +	not seen

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Г ₁₉	$pK^{-}\overline{\Lambda}+$ c.c.	not seen
Г ₂₀	$\Lambda \overline{\Xi}^+ K^- + \text{c.c.}$	not seen
Γ ₂₁	$\Sigma^0 \overline{\Xi}^+ K^- + \text{c.c.}$	not seen

ψ (4660) Γ (i) $\times \Gamma$ (e^+e^-)/ Γ (total)

Γ((ψ(2 <i>S</i>)π ⁺	$\pi^{-})$	×	Г((e+	e_)	/Γ _t	otal
					_			

$\Gamma_2\Gamma_1/\Gamma$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
• • • We do no	ot use th	e following data for	r averages, fits	, limits, etc. • • •
4.7±3.8		¹ ABLIKIM	21AJ BES3	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
11.2 ± 3.2		² ABLIKIM	21AJ BES3	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
4.7±4.2		³ ABLIKIM	21AJ BES3	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
11.3 ± 3.3		⁴ ABLIKIM	21AJ BES3	$e^+e^- \rightarrow \pi^+\pi^-\psi(2S)$
$2.0\!\pm\!0.3\!\pm\!0.2$	279	⁵ WANG	15A BELL	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
$8.1\!\pm\!1.1\!\pm\!1.0$	279	⁶ WANG	15A BELL	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
$2.7\!\pm\!1.3\!\pm\!0.5$	37	⁷ LEES	14F BABR	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
$7.5\!\pm\!1.7\!\pm\!0.7$	37	⁸ LEES	14F BABR	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
$2.2^{+0.7}_{-0.6}$	44	⁹ LIU	08H RVUE	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
5.9 ± 1.6	44	¹⁰ LIU	08H RVUE	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
$3.0\!\pm\!0.9\!\pm\!0.3$	44	⁷ WANG	07D BELL	10.58 $e^+e^- \rightarrow \gamma \pi^+\pi^-\psi(2S)$
$7.6\!\pm\!1.8\!\pm\!0.8$	44	⁸ WANG	07D BELL	10.58 $e^+e^- \to \gamma \pi^+\pi^-\psi(2S)$

¹Solution I of four equivalent solutions in a fit using three interfering resonances.

²Solution II of four equivalent solutions in a fit using three interfering resonances.

³Solution III of four equivalent solutions in a fit using three interfering resonances.

⁴Solution IV of four equivalent solutions in a fit using three interfering resonances.

⁵ Solution I of two equivalent solutions from a fit using two interfering resonances. Supersedes WANG 07D.

⁶Solution II of two equivalent solutions from a fit using two interfering resonances. Supersedes WANG 07D.

⁷Solution I of two equivalent solutions in a fit using two interfering resonances.

⁸ Solution II of two equivalent solutions in a fit using two interfering resonances.
 ⁹ Solution I in a combined fit of AUBERT 07S and WANG 07D data with two resonances.
 ¹⁰ Solution II in a combined fit of AUBERT 07S and WANG 07D data with two resonances.

$\Gamma(J/\psi\eta) \times \Gamma(e$	$(+e^{-})/\Gamma_{tota}$	1				$\Gamma_3\Gamma_1/\Gamma$
VALUE (eV)	CL%	DOCUMENT I	D	TECN	COMMENT	-
• • • We do not us	se the followin	g data for averag	ges, fits,	limits,	etc. • • •	
<0.94	90	WANG	13 B	BELL	$e^+e^- ightarrow$	$J/\psi\eta\gamma$
$\Gamma(D^{*0}D^{*-}\pi^+)$	× Г(е ⁺ е ⁻))/F _{total}		TFCN	COMMENT	$\Gamma_5\Gamma_1/\Gamma$
• • • We do not us	se the followin	g data for averag	ges, fits,	limits,	etc. • • •	
19 to 2005		¹ ABLIKIM	23X	BES3	$e^+e^- \rightarrow$	$D^{*0}D^{*-}\pi^+$
¹ From a cross-se GeV, assuming a	ction measure a coherent sum	ment of e ⁺ e ⁻ – n of 3 Breit-Wign	→ D ^{*0} er resona	$D^{*-}\pi^+$ ances p	- between 4 lus a continu	.189 and 4.951 ium amplitude.

Depending on solutions I - VIII with same fit qualities.

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$\Gamma(\Xi^-\overline{\Xi}^+) \times \Gamma(e$	e ⁺ e ⁻)/Γ _{tα}	otal				Г ₁₈ Г ₁ /Г
VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT	
<19.9 × 10 ⁻³	90	¹ ABLIKIM	23Bk	BES3	$e^+e^- \rightarrow$	ψ (4660)
¹ From a fit to e^+	$e^- \rightarrow \Xi^-$	$\overline{\Xi}^+$ cross sections				
$(pK^{-}\overline{\Lambda}+c.c.)$	× Г(<i>е</i> +е-	⁻)/Γ _{total}				$\Gamma_{19}\Gamma_1/\Gamma$
VALUE (eV)	<u>CL%</u>	DOCUMENT ID		TECN	COMMENT	
$< 2.8 \times 10^{-3}$	90	¹ ABLIKIM	23BL	BES3	$e^+e^- \rightarrow$	ψ (4660)
¹ From a fit to e ⁺	$e^- \rightarrow pK$	$\overline{\Lambda}$ + c.c. cross se	ctions.			
$(\Lambda \overline{\Xi}^+ K^- + c.c.)$) × Г(е ⁺	$e^{-})/\Gamma_{total}$				Г ₂₀ Г ₁ /Г
<i>ALUE</i> (eV)	<u>CL%</u>	DOCUMENT ID	TEC	<u>CN</u> <u>CO</u>	MMENT	- 1
<13.0 × 10 ⁻⁵	90 1	ABLIKIM 24	IAL BE	S3 e ⁺	$e^- \rightarrow \Lambda \Xi$	$K^+ K^- + c.c.$
¹ A fit to the Born the continuum.	cross sectior Two solution	$h ext{ of } e^+ e^- o \Lambda \Xi$ s from the fit.	+ K-	+ c.c. i	ncluding int	erference with
$(\Sigma^0 \overline{\Xi}^+ K^- + c.c)$	с.) × Г(е	$+e^{-})/\Gamma_{total}$				$\Gamma_{21}\Gamma_1/\Gamma_1$
ALUE (eV)	<u></u> <u>D</u>	OCUMENT ID	TECN	СОМ	MENT	/
<77.3 × 10^{−3} g	00 ¹ A	BLIKIM 24A	L BESS	3 e ⁺ e	$- \rightarrow \Sigma^0 \Xi$	$\frac{1}{K^{-}} + c.c.$
	cross sectio	on of $e^+e^- \rightarrow \Sigma$	<u>−0</u> <u>=</u> +	K ⁻ + 0	c.c. includin	g interference
¹ A fit to the Born with the continu	um. Two sol	utions from the fit	•			
¹ A fit to the Born with the continue	um. Two sol ψ(466()) Γ(i) × Γ(e ⁺ e	-)/Г²	² (total))	
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_1$	um. Two sol ψ(4660 cotal × Γ(0 	b) $\Gamma(i) \times \Gamma(e^+ e^-) / \Gamma_{total}$	-)/Г²	2(total)	COMMENT	
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_1$ (ALUE (0.37 × 10 ⁻⁶	$\frac{\psi(4660)}{\psi(4660)} \times \Gamma(460)$	b) $\Gamma(i) \times \Gamma(e^+ e^-)$ $e^+ e^-) / \Gamma_{total}$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA	_)/Γ ² 09	2(total) <u>TECN</u> BELL	$\frac{COMMENT}{e^+e^-} \rightarrow$	$\frac{\Gamma_4}{D^0 D^{*-} \pi^+}$
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_1$ ALUE $< 0.37 \times 10^{-6}$ ¹ Using 4664 ± 11	um. Two sol ψ (4660 sotal × Γ($\frac{CL\%}{90}$ ± 5 MeV for	D) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-) / \Gamma_{\mathbf{total}}$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA for the mass of $\psi(4)$	·)/Γ ² 09 660).	2 (total) <u>TECN</u> BELL	$\frac{COMMENT}{e^+e^-} \rightarrow$	$\frac{\Gamma_4}{D^0 D^{*-} \pi^+}$
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_1$ ALUE $< 0.37 \times 10^{-6}$ ¹ Using 4664 ± 11 $(\Lambda_c^+ \Lambda_c^-)/\Gamma_{total}$	um. Two sol $\psi(4660)$ sotal × $\Gamma(e)$ g_0 $\pm 5 MeV for × \Gamma(e^+e^-)$	D) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-) / \Gamma_{\mathbf{total}}$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA for the mass of $\psi(4^-) / \Gamma_{\mathbf{total}}$	- _)/Γ² 09 660).	2 (total) <u>TECN</u> BELL	Γ $\frac{COMMENT}{e^+e^-} \rightarrow$ Γ_1	$\frac{\Gamma_4}{\Gamma} \times \Gamma_1 / \Gamma$ $\frac{\Gamma_0 D^* - \pi^+}{\Gamma_1 / \Gamma}$
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_1$ (ALUE $< 0.37 \times 10^{-6}$ ¹ Using 4664 ± 11 $(\Lambda_c^+ \Lambda_c^-)/\Gamma_{total}$ (ALUE (units 10 ⁻⁶)	um. Two sol $\psi(4666)$ total × $\Gamma(4)$ g_0 $\pm 5 MeV for × \Gamma(e^+e^-)EVTS$	b) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-) / \Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ PAKHLOVA for the mass of $\psi(4^-) / \Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$)/Г² 09 660).	2(total) <u>TECN</u> BELL <u>TECN</u>	$\begin{matrix} \hline \Gamma \\ \underline{COMMENT} \\ e^+ e^- \rightarrow \\ \hline \Gamma_1 \\ \underline{COMMENT} \end{matrix}$	$\frac{\mathbf{f}_4}{D^0 D^{*-} \pi^+}$ $\frac{1}{\Gamma} \times \Gamma_1 / \Gamma$
¹ A fit to the Born with the continue ($D^0 D^{*-} \pi^+$)/ Γ_1 (ALUE (0.37 × 10 ⁻⁶) ¹ Using 4664 ± 11 ($\Lambda_c^+ \Lambda_c^-$)/ Γ_{total} (ALUE (units 10 ⁻⁶) .68+0.16+0.29 -0.15-0.30	um. Two sol $\psi(4660)$ sotal × $\Gamma(4)$ g_{0} $\pm 5 MeV for × \Gamma(e^+e^-)EVTS142$	b) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-) / \Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ PAKHLOVA for the mass of $\psi(4^-) / \Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ 1 PAKHLOVA)/Г² 09 660). 08в	2(total) <u>TECN</u> BELL <u>TECN</u> BELL	$ \begin{array}{c} \hline \Gamma_{1} \\ \hline e^{+}e^{-} \rightarrow \\ \end{array} \begin{array}{c} \hline \Gamma_{1} \\ \hline e^{+}e^{-} \rightarrow \\ \end{array} $	$\frac{\Gamma_4}{D^0 D^{*-} \pi^+}$ 1/ $\Gamma \times \Gamma_1/\Gamma$ $\Lambda_c^+ \Lambda_c^-$
¹ A fit to the Born with the continuut ($D^0 D^{*-} \pi^+$)/ Γ_1 (ALUE (0.37 × 10 ⁻⁶) ¹ Using 4664 ± 11 ($\Lambda_c^+ \Lambda_c^-$)/ Γ_{total} (ALUE (units 10 ⁻⁶) ($\Delta_{c} - 0.15 - 0.30$) ¹ The $\pi^+ \pi^- \psi$ (25)	um. Two sol $\psi(4660)$ sotal × $\Gamma(e^{-1})$ $\pm 5 MeV for × \Gamma(e^+e^-)-\frac{EVTS}{142}\psi(4660)\pm 5 MeV for \psi(4660)\pm 5 MeV for \psi(460)\pm 5 MeV for \psi(460)$	b) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT ID}{1}$ 1 PAKHLOVA $= 1^-$ States are not no)/Г² 09 660). 08B	2(total) <u>TECN</u> BELL <u>TECN</u> BELL	Γ $\frac{COMMENT}{e^+e^-} \rightarrow$ Γ_1 $\frac{COMMENT}{e^+e^-} \rightarrow$ ame.	$\frac{\Gamma_4}{D^0 D^{*-} \pi^+}$ 1/ $\Gamma \times \Gamma_1/\Gamma$ $\Lambda_c^+ \Lambda_c^-$
¹ A fit to the Born with the continue ($D^0 D^{*-} \pi^+$)/ Γ_{t} (AUE (0.37 × 10 ⁻⁶ ¹ Using 4664 ± 11 ($A_c^+ \Lambda_c^-$)/ Γ_{total} (AUE (units 10 ⁻⁶) ($AB_{-0.15-0.30}$ ¹ The $\pi^+ \pi^- \psi$ (25)	um. Two sol $\psi(4660)$ $\phi(460)$ $\phi($	b) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT ID}{1}$ 1 PAKHLOVA 1^- states are not not	—)/Г² 09 660). 08в ecessar	2(total) <u>TECN</u> BELL <u>TECN</u> BELL ily the s	$ \frac{COMMENT}{e^+e^-} \rightarrow F_1 $ $ \frac{COMMENT}{e^+e^-} \rightarrow ame. $	$\frac{\mathbf{f}_4}{\mathbf{f}_c} \times \mathbf{F}_1 / \mathbf{F}_1$ $\frac{\mathbf{f}_c}{\mathbf{f}_c} = \frac{\mathbf{f}_1}{\mathbf{f}_c} \times \mathbf{F}_1 / \mathbf{F}_1$
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_{1}$ (ALUE (0.37 × 10 ⁻⁶ ¹ Using 4664 ± 11 $(\Lambda_c^+ \Lambda_c^-)/\Gamma_{total}$ (ALUE (units 10 ⁻⁶) (ALUE (units 10 ⁻⁶))	um. Two sol $\psi(4660)$ $\psi(4660)$ $\psi(460)$ $\pm 5 MeV for \pm 5 \text{ MeV for \times \Gamma(e^+e^-)142\psi(46)$	b) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ 1 PAKHLOVA 1^- states are not not 1^- states are not not	-)/Γ² 09 660). 08Β ecessar	2(total) <u>TECN</u> BELL BELL ily the s	$ \begin{array}{c} \hline \Gamma_{1} \\ \hline e^{+}e^{-} \rightarrow \\ \hline \Gamma_{1} \\ \hline e^{+}e^{-} \rightarrow \\ ame. \end{array} $	$\frac{\mathbf{f}_{4}}{D^{0}D^{*-}\pi^{+}}$ $1/\mathbf{\Gamma} \times \mathbf{\Gamma}_{1}/\mathbf{\Gamma}$ $\Lambda_{c}^{+}\Lambda_{c}^{-}$
¹ A fit to the Born with the continue $(D^0 D^{*-} \pi^+)/\Gamma_1$ $(ALUE - \pi^+)/\Gamma_1$ $(A_{C}^+ \Lambda_{C}^-)/\Gamma_{total}$ $(A_{LUE (units 10^{-6})}^{-6})$ $(B_{-0.15 - 0.30}^{-6})$ $(D^0 D^{*-} \pi^+)/\Gamma_1$	um. Two sol $\psi(4660)$ $\psi(4660)$ $\psi(460)$ $\pm 5 MeV for \times \Gamma(e^+e^-)\frac{EVTS}{142}\psi(46)\psi(46)\psi(2S)\pi^+$	(utions from the fit D) $\Gamma(\mathbf{i}) \times \Gamma(e^+ e^-)$ $e^+ e^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ 1 PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{\mathbf{total}}$ $\frac{DOCUMENT \ ID}{1}$ 1 PAKHLOVA $\frac{1}{c}$ states are not not 60) BRANCHIN π^-)/Г² 09 660). 08B ecessar	2(total) <u>TECN</u> BELL BELL ily the s	$\Gamma_{e^{+}e^{-}} \rightarrow \Gamma_{1}$ $\frac{COMMENT}{e^{+}e^{-}} \rightarrow T_{1}$ ame.	$ \frac{\mathbf{f}_4}{\mathbf{f}} \times \mathbf{F}_1 / \mathbf{F}_1 \\ \frac{\mathbf{f}_0}{\mathbf{f}_0} \mathbf{f}_0^{*-} \pi^+ $ $ \mathbf{f}_1 / \mathbf{f} \times \mathbf{F}_1 / \mathbf{F}_1 \\ \frac{\mathbf{f}_c}{\mathbf{f}_c^+ \mathbf{f}_c^-} $ $ \mathbf{F}_4 / \mathbf{F}_2 $
¹ A fit to the Born with the continue ($D^0 D^{*-} \pi^+$)/ Γ_1 (ALUE <0.37 × 10 ⁻⁶ ¹ Using 4664 ± 11 ($\Lambda_c^+ \Lambda_c^-$)/ Γ_{total} ($\Lambda_c^+ \Lambda_c^-$)/ Γ_{total} (ALUE (units 10 ⁻⁶) 1.68+0.16+0.29 -0.15-0.30 ¹ The $\pi^+ \pi^- \psi(2S)$ ($D^0 D^{*-} \pi^+$)/ Γ_1 (ALUE	um. Two sol $\psi(4660)$ $\phi(4660)$ $\phi(460)$ $\pm 5 MeV for \times \Gamma(e^+e^-)\frac{EVTS}{142}\psi(46)\psi(46)(\psi(2S)\pi^+)\frac{CL\%}{2}$	b) $\Gamma(i) \times \Gamma(e^+ e^-)$ $\frac{DOCUMENT ID}{1}$ $\frac{DOCUMENT ID}{1}$ Γ PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{total}$ $\frac{DOCUMENT ID}{1}$ $\frac{1}{PAKHLOVA}$ $\frac{1}{c}$ states are not not $\frac{1}{c}$ States are not not $\frac{1}{c}$ DBRANCHIN $\pi^-)$ $\frac{DOCUMENT ID}{1}$)/Г² 09 660). 08B ecessar	TECN BELL <u>TECN</u> BELL ily the s TIOS	Γ $\frac{COMMENT}{e^+e^-} \rightarrow$ Γ_1 $\frac{COMMENT}{e^+e^-} \rightarrow$ ame.	$\frac{\Gamma_4}{\Gamma} \times \Gamma_1/\Gamma$ $\frac{\Gamma_0 D^* - \pi^+}{\Gamma_1/\Gamma}$ $\frac{\Gamma_1/\Gamma}{\Lambda_c^+ \Lambda_c^-}$ Γ_4/Γ_2
¹ A fit to the Born with the continue ($D^0 D^{*-} \pi^+$)/ Γ_{1} (ΔLUE <0.37 × 10 ⁻⁶ ¹ Using 4664 ± 11 ($\Lambda_c^+ \Lambda_c^-$)/ Γ_{total} (ΔLUE (units 10 ⁻⁶) ($\Delta B + 0.16 + 0.29$ -0.15 - 0.30 ¹ The $\pi^+ \pi^- \psi$ (25) ($D^0 D^{*-} \pi^+$)/ Γ_{1} (ΔLUE <10	um. Two sol $\psi(4666)$ $\phi(4666)$ $\phi(466)$ $\pm 5 MeV for \times \Gamma(e^+e^-evts142\psi(46)\psi(46)(\psi(2S)\pi^+g_0$	b) $\Gamma(i) \times \Gamma(e^+ e^-)$ $\frac{DOCUMENT ID}{1}$ $\frac{DOCUMENT ID}{1}$ Γ PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{total}$ $\frac{DOCUMENT ID}{1}$ $\frac{DOCUMENT ID}{1}$ Γ states are not not π^-) $\frac{DOCUMENT ID}{2}$ π^-) $\frac{DOCUMENT ID}{2}$	-)/Γ ² 09 660). 08Β ecessar IG RA	2(total) <u>TECN</u> BELL ily the s TIOS <u>TECN</u> BELL	$ \begin{array}{c} \Gamma \\ \underline{COMMENT} \\ e^+ e^- \rightarrow \\ \Gamma_1 \\ \underline{COMMENT} \\ e^+ e^- \rightarrow \\ ame. \\ \end{array} $	$ \frac{\mathbf{f}_{4}}{D^{0} D^{*-} \pi^{+}} $ $ \frac{\mathbf{f}_{1}}{D^{0} D^{*-} \pi^{+}} $ $ \frac{\mathbf{f}_{4}}{\Lambda_{c}^{+} \Lambda_{c}^{-}} $ $ \frac{\mathbf{f}_{4}}{D^{0} D^{*-} \pi^{+}} $
¹ A fit to the Born with the continue ($D^0 D^{*-} \pi^+$)/ Γ_1 (ALUE (0.37 × 10 ⁻⁶) ¹ Using 4664 ± 11 ($\Lambda_c^+ \Lambda_c^-$)/ Γ_{total} (ALUE (units 10 ⁻⁶) (Δ_{LUE} (units 10 ⁻⁶) ($D^0 D^{*-} \pi^+$)/ Γ_1 (Δ_{LUE} (10 (ψ_2 (3823) $\pi^+ \pi^-$	um. Two sol $\psi(4660)$ $\phi(4660)$ $\phi(4660)$ $\pm 5 MeV for \times \Gamma(e^+e^-)\frac{EVTS}{142}\psi(460)\psi(460)(\psi(2S)\pi^+)\frac{CL\%}{90}\phi(-)/\Gamma_{\text{total}}$	b) $\Gamma(i) \times \Gamma(e^+ e^-)$ $\frac{DOCUMENT ID}{1}$ 1 PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{\text{total}}$ $\frac{DOCUMENT ID}{1}$ 1 PAKHLOVA $\frac{DOCUMENT ID}{1}$ 1 PAKHLOVA $\frac{1}{c}$ states are not not $\pi^-)$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA)/Г² 09 660). 08B ecessar IG RA	etation (total)	$\frac{COMMENT}{e^+e^-} \rightarrow \mathbf{\Gamma_1}$ $\frac{COMMENT}{e^+e^-} \rightarrow \mathbf{ame}.$ $\frac{COMMENT}{e^+e^-} \rightarrow \mathbf{ame}$	$ \frac{\Gamma_4}{\Gamma} \times \Gamma_1/\Gamma \\ \frac{\Gamma_0}{D^0} D^{*-} \pi^+ $ $ \frac{\Gamma_4}{\Gamma_2} \Gamma_2 $ $ \frac{\Gamma_4}{\Gamma_2} \Gamma_6/\Gamma $
¹ A fit to the Born with the continue ($D^0 D^{*-} \pi^+$)/ Γ_1 (<u>ALUE</u> (0.37 × 10 ⁻⁶ ¹ Using 4664 ± 11 (<u>ALUE (units 10⁻⁶)</u>). ($A_{c}^{+} \Lambda_{c}^{-}$)/ Γ_{total} (<u>ALUE (units 10⁻⁶)</u>). ($B_{-0.15 - 0.30$ ¹ The $\pi^+ \pi^- \psi$ (25) (<u>ALUE</u> (10) (<u>(ψ_2(3823))$\pi^+ \pi^-$ (<u>ALUE</u>)</u>	um. Two sol $\psi(4666)$ $\phi(4666)$ $\phi(4666)$ $\pm 5 \text{ MeV for \times \Gamma(e^+e^-)^{EVTS}142\psi(46)\psi(46)(\psi(2S)\pi^+)^{-}g_0$	b) $\Gamma(i) \times \Gamma(e^+ e^-)$ $\frac{DOCUMENT ID}{1}$ $\frac{DOCUMENT ID}{1}$ Γ PAKHLOVA for the mass of $\psi(4^-)/\Gamma_{total}$ $\frac{DOCUMENT ID}{1}$ $\frac{DOCUMENT ID}{1}$ $\pi^-)$ $\frac{DOCUMENT ID}{1}$ PAKHLOVA	-)/Γ ² 09 660). 08Β ecessar IG RA	2 (total) <u>TECN</u> BELL ily the s TIOS <u>TECN</u> BELL <u>TECN</u> BELL	$ \begin{array}{c} \Gamma \\ \underline{COMMENT} \\ e^+ e^- \rightarrow \\ \end{array} $ $ \begin{array}{c} COMMENT \\ e^+ e^- \rightarrow \\ \hline \\ ame. \\ \end{array} $ $ \begin{array}{c} COMMENT \\ e^+ e^- \rightarrow \\ \hline \\ \hline \\ e^+ e^- \rightarrow \\ \end{array} $	$\frac{\mathbf{f}_{4}/\mathbf{\Gamma} \times \mathbf{\Gamma}_{1}/\mathbf{\Gamma}}{D^{0} D^{*-} \pi^{+}}$ $1/\mathbf{\Gamma} \times \mathbf{\Gamma}_{1}/\mathbf{\Gamma}$ $\frac{\Lambda_{c}^{+} \Lambda_{c}^{-}}{\Gamma_{c}^{0} D^{*-} \pi^{+}}$ $\mathbf{\Gamma}_{6}/\mathbf{\Gamma}$

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Citation: S. Navas et al. (Particle Data Group), Phys. Rev. D ${\bf 110},$ 030001 (2024) and 2025 update

$\Gamma(\omega \pi^0) / \Gamma_{total}$					Г ₁₄ /Г
VALUE	DOCUMENT ID		TECN	COMMENT	
not seen	ABLIKIM	22к	BES3	$e^+e^- ightarrow \omega \pi^0$	
$\Gamma(\omega\eta)/\Gamma_{total}$					Г ₁₅ /Г
VALUE	DOCUMENT ID		TECN	COMMENT	
not seen	ABLIKIM	22K	BES3	$e^+ e^- ightarrow \omega \eta$	

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