$\psi(4160)$

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

$\psi(4160)$ MASS

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
4191 ± 5 OUR AVERAGE					
$4191\ ^{+\ 9}_{-\ 8}$		AAIJ	13BC	LHCB	$B^+ \to K^+\mu^+\mu^-$
4191.7± 6.5		[1] ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4193 ± 7		[2] MO	10	RVUE	$e^+e^- \to$ hadrons
4151 ± 4		[3] SETH	05A	RVUE	$e^+e^- \to$ hadrons
4155 ± 5		[4] SETH	05A	RVUE	$e^+e^- \to$ hadrons
4159 ±20		BRANDELIK	78C	DASP	e^+e^-

[1] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = (293 \pm 57)^\circ$.

[2] Reanalysis of data presented in BAI 00 and BAI 02C. From a global fit over the center-of-mass energy 3.8-4.8 GeV covering the $\psi(4040)$, $\psi(4160)$ and $\psi(4415)$ resonances and including interference effects.

[3] From a fit to Crystal Ball (OSTERHELD 86) data.

[4] From a fit to BES (BAI 02C) data.

$\psi(4160)$ WIDTH

VALUE (MeV)		DOCUMENT ID		TECN	COMMENT
70 ±10 OUR AVERAGE					
$65\ ^{+22}_{-16}$		AAIJ	13BC	LHCB	$B^+ \to K^+\mu^+\mu^-$
71.8±12.3		[5] ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
79 ±14		[6] MO	10	RVUE	$e^+e^- \to$ hadrons
107 ±10		[7] SETH	05A	RVUE	$e^+e^- \to$ hadrons
107 ±16		[8] SETH	05A	RVUE	$e^+e^- \to$ hadrons
78 ±20		BRANDELIK	78C	DASP	e^+e^-

[5] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = (293 \pm 57)^\circ$.

[6] Reanalysis of data presented in BAI 00 and BAI 02C. From a global fit over the center-of-mass energy 3.8-4.8 GeV covering the $\psi(4040)$, $\psi(4160)$ and $\psi(4415)$ resonances and including interference effects.

[7] From a fit to Crystal Ball (OSTERHELD 86) data.

[8] From a fit to BES (BAI 02C) data.

$\psi(4160)$ 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)		Confidence level
Γ_1	$e^+ e^-$	$(6.9 \pm 3.3) \times 10^{-6}$		
Γ_2	$\mu^+ \mu^-$	seen		
Γ_3	$D\overline{D}$	seen		
Γ_4	$D^0 \overline{D}^0$	seen		
Γ_5	$D^+ D^-$	seen		
Γ_6	$D^* \overline{D}$ + c.c.	seen		
Γ_7	$D^*(2007)^0 \overline{D}^0$ + c.c.	seen		
Γ_8	$D^*(2010)^+ D^-$ + c.c.	seen		
Γ_9	$D^* \overline{D}^*$	seen		
Γ_{10}	$D^*(2007)^0 \overline{D}^*(2007)^0$	seen		
Γ_{11}	$D^*(2010)^+ D^*(2010)^-$	seen		
Γ_{12}	$D^0 D^- \pi^+$ +c.c. (excl. $D^*(2007)^0 \overline{D}^0$ +c.c., $D^*(2010)^+ D^-$ +c.c.)	not seen		
Γ_{13}	$D\overline{D}^* \pi$ +c.c. (excl. $D^* \overline{D}^*$)	seen		
Γ_{14}	$D^0 D^{*-} \pi^+$ +c.c. (excl. $D^*(2010)^+ D^*(2010)^-$)	not seen		
Γ_{15}	$D_s^+ D_s^-$	not seen		
Γ_{16}	$D_s^{*+} D_s^-$ +c.c.	seen		
Γ_{17}	$J/\psi \pi^+ \pi^-$	< 3	$\times 10^{-3}$	90%
Γ_{18}	$J/\psi \pi^0 \pi^0$	< 3	$\times 10^{-3}$	90%
Γ_{19}	$J/\psi K^+ K^-$	< 2	$\times 10^{-3}$	90%
Γ_{20}	$J/\psi \eta$	< 8	$\times 10^{-3}$	90%
Γ_{21}	$J/\psi \pi^0$	< 1	$\times 10^{-3}$	90%
Γ_{22}	$J/\psi \eta'$	< 5	$\times 10^{-3}$	90%
Γ_{23}	$J/\psi \pi^+ \pi^- \pi^0$	< 1	$\times 10^{-3}$	90%
Γ_{24}	$\psi(2S) \pi^+ \pi^-$	< 4	$\times 10^{-3}$	90%
Γ_{25}	$\chi_{c1} \gamma$	< 5	$\times 10^{-3}$	90%
Γ_{26}	$\chi_{c2} \gamma$	< 1.3	%	90%
Γ_{27}	$\chi_{c1} \pi^+ \pi^- \pi^0$	< 2	$\times 10^{-3}$	90%
Γ_{28}	$\chi_{c2} \pi^+ \pi^- \pi^0$	< 8	$\times 10^{-3}$	90%
Γ_{29}	$h_c(1P) \pi^+ \pi^-$	< 5	$\times 10^{-3}$	90%
Γ_{30}	$h_c(1P) \pi^0 \pi^0$	< 2	$\times 10^{-3}$	90%
Γ_{31}	$h_c(1P) \eta$	< 2	$\times 10^{-3}$	90%
Γ_{32}	$h_c(1P) \pi^0$	< 4	$\times 10^{-4}$	90%

Γ_{33}	$\phi\pi^+\pi^-$	< 2	$\times 10^{-3}$	90%
Γ_{34}	$\gamma X(3872) \rightarrow \gamma J/\psi\pi^+\pi^-$	< 6.8	$\times 10^{-5}$	90%
Γ_{35}	$\gamma X(3915) \rightarrow \gamma J/\psi\pi^+\pi^-$	< 1.36	$\times 10^{-4}$	90%
Γ_{36}	$\gamma X(3930) \rightarrow \gamma J/\psi\pi^+\pi^-$	< 1.18	$\times 10^{-4}$	90%
Γ_{37}	$\gamma X(3940) \rightarrow \gamma J/\psi\pi^+\pi^-$	< 1.47	$\times 10^{-4}$	90%
Γ_{38}	$\gamma X(3872) \rightarrow \gamma\gamma J/\psi$	< 1.05	$\times 10^{-4}$	90%
Γ_{39}	$\gamma X(3915) \rightarrow \gamma\gamma J/\psi$	< 1.26	$\times 10^{-4}$	90%
Γ_{40}	$\gamma X(3930) \rightarrow \gamma\gamma J/\psi$	< 8.8	$\times 10^{-5}$	90%
Γ_{41}	$\gamma X(3940) \rightarrow \gamma\gamma J/\psi$	< 1.79	$\times 10^{-4}$	90%
Γ_{42}	K^+K^-			

$\psi(4160)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ Γ_1

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.48±0.22	[9] ABLIKIM	08D	BES2	$e^+e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.4 to 1.1	[10] MO	10	RVUE	$e^+e^- \rightarrow$ hadrons
0.83±0.08	[11] SETH	05A	RVUE	$e^+e^- \rightarrow$ hadrons
0.84±0.13	[12] SETH	05A	RVUE	$e^+e^- \rightarrow$ hadrons
0.77±0.23	BRANDELIK	78C	DASP	e^+e^-

[9] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = (293 \pm 57)^\circ$.

[10] Reanalysis of data presented in BAI 00 and BAI 02C. From a global fit over the center-of-mass energy 3.8-4.8 GeV covering the $\psi(4040)$, $\psi(4160)$ and $\psi(4415)$ resonances and including interference effects. Four sets of solutions are obtained with the same fit quality, mass and total width, but with different e^+e^- partial widths. We quote only the range of values.

[11] From a fit to Crystal Ball (OSTERHELD 86) data.

[12] From a fit to BES (BAI 02C) data.

$\psi(4160)$ $\Gamma(i) \times \Gamma(e^+e^-)/\Gamma(total)$

$\Gamma(\chi_{c1}\gamma) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{25}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<2.2	90	[13] HAN	15	BELL	10.58 $e^+e^- \rightarrow \chi_{c1}\gamma$

[13] Using B($\eta \rightarrow \gamma\gamma$) = (39.41 ± 0.21)%.

$\Gamma(\chi_{c2}\gamma) \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{26}\Gamma_1/\Gamma$

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6.1	90	[14] HAN	15	BELL	10.58 $e^+e^- \rightarrow \chi_{c2}\gamma$

[14] Using B($\eta \rightarrow \gamma\gamma$) = (39.41 ± 0.21)%.

$\psi(4160)$ $\Gamma(i) \times \Gamma(e^+e^-)/\Gamma^2(total)$

$\Gamma(J/\psi\eta)/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ $\Gamma_{20}/\Gamma \times \Gamma_1/\Gamma$

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.8 \pm 0.9 \pm 0.9$	[15] WANG	13B	BELL	$e^+e^- \to J/\psi\eta\gamma$
$12.8 \pm 1.7 \pm 2.0$	[16] WANG	13B	BELL	$e^+e^- \to J/\psi\eta\gamma$

[15] Solution I of two equivalent solutions in a fit using two interfering resonances. Mass and width fixed at 4153 MeV and 103 MeV, respectively.

[16] Solution II of two equivalent solutions in a fit using two interfering resonances. Mass and width fixed at 4153 MeV and 103 MeV, respectively.

$\psi(4160)$ BRANCHING RATIOS

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	[17] AAIJ	13BC	LHCB	$B^+ \to K^+\mu^+\mu^-$

[17] AAIJ 13BC report $B(B^+ \to K^+\psi(4160))\, B(\psi(4160) \to \mu^+\mu^-) = (3.5^{+0.9}_{-0.8}) \times 10^{-9}$.

$\Gamma(D\overline{D})/\Gamma(D^*\overline{D}^*)$ Γ_3/Γ_9

VALUE	DOCUMENT ID		TECN	COMMENT
$0.02 \pm 0.03 \pm 0.02$	AUBERT	09M	BABR	$e^+e^- \to \gamma D^{(*)}\overline{D}^{(*)}$

$\Gamma(D^0\overline{D}^0)/\Gamma_{total}$ Γ_4/Γ

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

$\Gamma(D^+D^-)/\Gamma_{total}$ Γ_5/Γ

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

$\Gamma(D^*(2007)^0\overline{D}^0 + \text{c.c.})/\Gamma_{total}$ Γ_7/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AUBERT	09M	BABR	$e^+e^- \to D^{*0}\overline{D}^0\gamma$
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^{*0}\overline{D}^0$

$\Gamma(D^*(2010)^+D^- + \text{c.c.})/\Gamma_{total}$ Γ_8/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AUBERT	09M	BABR	$e^+e^- \to D^{*+}D^-\gamma$
seen	CRONIN-HEN..09		CLEO	$e^+e^- \to D^{*+}D^-$
seen	PAKHLOVA	07	BELL	$e^+e^- \to D^{*+}D^-\gamma$

$\Gamma(D^* \overline{D} + \text{c.c.})/\Gamma(D^* \overline{D}^*)$ Γ_6/Γ_9

VALUE	DOCUMENT ID		TECN	COMMENT
0.34±0.14±0.05	AUBERT	09M	BABR	$e^+ e^- \to \gamma D^{(*)} \overline{D}^{(*)}$

$\Gamma(D^*(2007)^0 \overline{D}^*(2007)^0)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AUBERT	09M	BABR	$e^+ e^- \to D^{*0} \overline{D}^{*0} \gamma$
seen	CRONIN-HEN..	09	CLEO	$e^+ e^- \to D^{*0} \overline{D}^{*0}$

$\Gamma(D^*(2010)^+ D^*(2010)^-)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AUBERT	09M	BABR	$e^+ e^- \to D^{*+} D^{*-} \gamma$
seen	CRONIN-HEN..	09	CLEO	$e^+ e^- \to D^{*+} D^{*-}$
seen	PAKHLOVA	07	BELL	$e^+ e^- \to D^{*+} D^{*-} \gamma$

$\Gamma(D^0 D^- \pi^+ + \text{c.c. (excl. } D^*(2007)^0 \overline{D}^0 + \text{c.c., } D^*(2010)^+ D^- + \text{c.c.}))/\Gamma_{\text{total}}$ Γ_{12}/Γ

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

$\Gamma(D \overline{D}^* \pi + \text{c.c. (excl. } D^* \overline{D}^*))/\Gamma_{\text{total}}$ Γ_{13}/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_{14}/Γ

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

$\Gamma(D_s^+ D_s^-)/\Gamma_{\text{total}}$ Γ_{15}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	PAKHLOVA	11	BELL	$e^+ e^- \to D_s^+ D_s^- \gamma$
not seen	DEL-AMO-SA..	10N	BABR	$e^+ e^- \to D_s^+ D_s^- \gamma$
not seen	CRONIN-HEN..	09	CLEO	$e^+ e^- \to D_s^+ D_s^-$

$\Gamma(D_s^{*+} D_s^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{16}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	PAKHLOVA	11	BELL	$e^+ e^- \to D_s^{*+} D_s^- \gamma$
seen	DEL-AMO-SA..	10N	BABR	$e^+ e^- \to D_s^{*+} D_s^- \gamma$
seen	CRONIN-HEN..	09	CLEO	$e^+ e^- \to D_s^{*+} D_s^-$

$\Gamma(J/\psi \pi^+ \pi^-)/\Gamma_{\text{total}}$ Γ_{17}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<3	90	COAN	06	CLEO	4.12–4.2 $e^+ e^- \to$ hadrons

$\Gamma(J/\psi \pi^0 \pi^0)/\Gamma_{\text{total}}$ Γ_{18}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<3	90	COAN	06	CLEO	4.12–4.2 $e^+ e^- \to$ hadrons

$\Gamma(J/\psi K^+ K^-)/\Gamma_{total}$ Γ_{19}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(J/\psi\eta)/\Gamma_{total}$ Γ_{20}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<8	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

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

possibly seen	[18]	ABLIKIM	15L	BES3	$e^+e^- \to J/\psi\eta$
seen		WANG	13B	BELL	$e^+e^- \to J/\psi\eta\gamma$

[18] An enhancement around 4.2 GeV is observed.

$\Gamma(J/\psi\pi^0)/\Gamma_{total}$ Γ_{21}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(J/\psi\eta')/\Gamma_{total}$ Γ_{22}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<5	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(J/\psi\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{23}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(\psi(2S)\pi^+\pi^-)/\Gamma_{total}$ Γ_{24}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<4	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(\chi_{c1}\gamma)/\Gamma_{total}$ Γ_{25}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT

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

<7	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(\chi_{c2}\gamma)/\Gamma_{total}$ Γ_{26}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<13	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(\chi_{c1}\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{27}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(\chi_{c2}\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_{28}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<8	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(h_c(1P)\pi^+\pi^-)/\Gamma_{total}$ Γ_{29}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<5	90	[19] PEDLAR	11	CLEO	$e^+e^- \to h_c(1P)\pi^+\pi^-$

[19] At $\sqrt{s}$ = 4170 MeV, PEDLAR 11 measures $\sigma(e^+e^- \to h_c(1P)\pi^+\pi^-) = 15.6 \pm 2.3 \pm 1.9 \pm 3.0$ pb, where the errors are statistical, systematic, and due to uncertainty in $B(\psi(2S) \to \pi^0 h_c(1P))$, respectively.

$\Gamma(h_c(1P)\pi^0\pi^0)/\Gamma_{total}$ Γ_{30}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	[20] PEDLAR	11	CLEO	$e^+e^- \to h_c(1P)\pi^0\pi^0$

[20] At $\sqrt{s}$ = 4170 MeV, PEDLAR 11 measures $\sigma(e^+e^- \to h_c(1P)\pi^0\pi^0) = 3.0 \pm 3.3 \pm 1.1 \pm 0.6$ pb, where the errors are statistical, systematic, and due to uncertainty in $B(\psi(2S) \to \pi^0 h_c(1P))$, respectively.

$\Gamma(h_c(1P)\eta)/\Gamma_{total}$ Γ_{31}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	[21] PEDLAR	11	CLEO	$e^+e^- \to h_c(1P)\eta$

[21] At $\sqrt{s}$ = 4170 MeV, PEDLAR 11 measures $\sigma(e^+e^- \to h_c(1P)\eta) = 4.7 \pm 1.7 \pm 1.0 \pm 0.9$ pb, where the errors are statistical, systematic, and due to uncertainty in $B(\psi(2S) \to \pi^0 h_c(1P))$, respectively.

$\Gamma(h_c(1P)\pi^0)/\Gamma_{total}$ Γ_{32}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<0.4	90	[22] PEDLAR	11	CLEO	$e^+e^- \to h_c(1P)\pi^0$

[22] At $\sqrt{s}$ = 4170 MeV, PEDLAR 11 measures $\sigma(e^+e^- \to h_c(1P)\pi^0) = -0.7 \pm 1.8 \pm 0.7 \pm 0.1$ pb, where the errors are statistical, systematic, and due to uncertainty in $B(\psi(2S) \to \pi^0 h_c(1P))$, respectively.

$\Gamma(\phi\pi^+\pi^-)/\Gamma_{total}$ Γ_{33}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<2	90	COAN	06	CLEO	4.12–4.2 $e^+e^- \to$ hadrons

$\Gamma(\gamma X(3872) \to \gamma J/\psi\pi^+\pi^-)/\Gamma_{total}$ Γ_{34}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
$<0.68 \times 10^{-4}$	90	[23] XIAO	13	$\psi(4160) \to \gamma J/\psi\pi^+\pi^-$

[23] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3915) \to \gamma J/\psi\pi^+\pi^-)/\Gamma_{total}$ Γ_{35}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
$<1.36 \times 10^{-4}$	90	[24] XIAO	13	$\psi(4160) \to \gamma J/\psi\pi^+\pi^-$

[24] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3930) \to \gamma J/\psi\pi^+\pi^-)/\Gamma_{total}$ Γ_{36}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
$<1.18 \times 10^{-4}$	90	[25] XIAO	13	$\psi(4160) \to \gamma J/\psi\pi^+\pi^-$

[25] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3940) \to \gamma J/\psi\pi^+\pi^-)/\Gamma_{total}$ Γ_{37}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<1.47 × 10⁻⁴	90	[26] XIAO	13	$\psi(4160) \to \gamma J/\psi\pi^+\pi^-$

[26] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3872) \to \gamma\gamma J/\psi)/\Gamma_{total}$ Γ_{38}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<1.05 × 10⁻⁴	90	[27] XIAO	13	$\psi(4160) \to \gamma\gamma J/\psi$

[27] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3915) \to \gamma\gamma J/\psi)/\Gamma_{total}$ Γ_{39}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<1.26 × 10⁻⁴	90	[28] XIAO	13	$\psi(4160) \to \gamma\gamma J/\psi$

[28] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3930) \to \gamma\gamma J/\psi)/\Gamma_{total}$ Γ_{40}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<0.88 × 10⁻⁴	90	[29] XIAO	13	$\psi(4160) \to \gamma\gamma J/\psi$

[29] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(\gamma X(3940) \to \gamma\gamma J/\psi)/\Gamma_{total}$ Γ_{41}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<1.79 × 10⁻⁴	90	[30] XIAO	13	$\psi(4160) \to \gamma\gamma J/\psi$

[30] Obtained by analyzing CLEO data but not authored by the CLEO Collaboration.

$\Gamma(K^+K^-)/\Gamma_{total}$ Γ_{42}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2 \times 10^{-5}$	90	[31] DRUZHININ	15	RVUE	$e^+e^- \to \psi(3770)$

[31] DRUZHININ 15 uses BABAR and CLEO data takitaking into account interference of the processes $e^+e^- \to K^+K^-$ and $e^+e^- \to K^0_S K^0_L$.

$\psi(4160)$ REFERENCES

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