$\psi(4160)$

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

ψ(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 ψ(3770), ψ(4040), ψ(4160), and ψ(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 ψ(4040), ψ(4160) and ψ(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.

ψ(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 ψ(3770), ψ(4040), ψ(4160), and ψ(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 ψ(4040), ψ(4160) and ψ(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}	$\gamma X(3872) \to \gamma J/\psi\pi^+\pi^-$	< 6.8	$\times 10^{-5}$	90%
Γ_{35}	$\gamma X(3915) \to \gamma J/\psi\pi^+\pi^-$	< 1.36	$\times 10^{-4}$	90%
Γ_{36}	$\gamma X(3930) \to \gamma J/\psi\pi^+\pi^-$	< 1.18	$\times 10^{-4}$	90%
Γ_{37}	$\gamma X(3940) \to \gamma J/\psi\pi^+\pi^-$	< 1.47	$\times 10^{-4}$	90%
Γ_{38}	$\gamma X(3872) \to \gamma\gamma J/\psi$	< 1.05	$\times 10^{-4}$	90%
Γ_{39}	$\gamma X(3915) \to \gamma\gamma J/\psi$	< 1.26	$\times 10^{-4}$	90%
Γ_{40}	$\gamma X(3930) \to \gamma\gamma J/\psi$	< 8.8	$\times 10^{-5}$	90%
Γ_{41}	$\gamma X(3940) \to \gamma\gamma J/\psi$	< 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	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.4 to 1.1	[10] MO	10	RVUE	$e^+e^- \to$ hadrons
0.83±0.08	[11] SETH	05A	RVUE	$e^+e^- \to$ hadrons
0.84±0.13	[12] SETH	05A	RVUE	$e^+e^- \to$ 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.

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

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

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

[13] Using B($\eta \to \gamma\gamma$) = (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 $e^+e^- \to \chi_{c2}\gamma$

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

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

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

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	$e^+ e^- \rightarrow \gamma D^{(*)} \overline{D}^{(*)}$

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

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

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

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

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

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

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

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

$\Gamma(D^0 D^{*-} \pi^+ + \text{c.c.}\ (\text{excl. } D^*(2010)^+ D^*(2010)^-))/\Gamma_{\text{total}}$ — Γ_{14}/Γ

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

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

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

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

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

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

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<3	90	COAN	06	CLEO	4.12–4.2 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
possibly seen		[18] ABLIKIM	15L	BES3	$e^+ e^- \rightarrow J/\psi \eta$
seen		WANG	13B	BELL	$e^+ e^- \rightarrow J/\psi \eta \gamma$

[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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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 $e^+ e^- \rightarrow$ 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
$<1.05 \times 10^{-4}$	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
$<1.26 \times 10^{-4}$	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
$<0.88 \times 10^{-4}$	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
$<1.79 \times 10^{-4}$	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 $e^+e^- \to K^0_S K^0_L$.

ψ(4160) REFERENCES

ABLIKIM	15L	PR D91 112005	M. Ablikim et al.	(BES III Collab.)
DRUZHININ	15	PR D92 054024	V.P. Druzhinin	(NOVO)
HAN	15	PR D92 012011	Y.L. Han et al.	(BELLE Collab.)
AAIJ	13BC	PRL 111 112003	R. Aaij et al.	(LHCb Collab.)
WANG	13B	PR D87 051101	X.L. Wang et al.	(BELLE Collab.)
XIAO	13	PR D87 057501	T. Xiao et al.	(NWES, WAYN)
PAKHLOVA	11	PR D83 011101	G. Pakhlova et al.	(BELLE Collab.)
PEDLAR	11	PRL 107 041803	T. Pedlar et al.	(CLEO Collab.)
DEL-AMO-SA...	10N	PR D82 052004	P. del Amo Sanchez et al.	(BABAR Collab.)
MO	10	PR D82 077501	X.H. Mo, C.Z. Yuan, P. Wang	(BHEP)
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 091101	G. Pakhlova et al.	(BELLE Collab.)
ABLIKIM	08D	PL B660 315	M. Ablikim et al.	(BES Collab.)

PAKHLOVA	08	PR D77 011103	G. Pakhlova *et al.*	(BELLE Collab.)
PAKHLOVA	08A	PRL 100 062001	G. Pakhlova *et al.*	(BELLE Collab.)
PAKHLOVA	07	PRL 98 092001	G. Pakhlova *et al.*	(BELLE Collab.)
COAN	06	PRL 96 162003	T.E. Coan *et al.*	(CLEO Collab.)
SETH	05A	PR D72 017501	K.K. Seth	
BAI	02C	PRL 88 101802	J.Z. Bai *et al.*	(BES Collab.)
BAI	00	PRL 84 594	J.Z. Bai *et al.*	(BES Collab.)
OSTERHELD	86	SLAC-PUB-4160	A. Osterheld *et al.*	(SLAC Crystal Ball Collab.)
BRANDELIK	78C	PL 76B 361	R. Brandelik *et al.*	(DASP Collab.)