NODE=M073

$\psi(4415)$ [a]

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

[a] J^{PC} known by production in e^+e^- via single photon annihilation. I^G is not known; interpretation of this state as a single resonance is unclear because of the expectation of substantial threshold effects in this energy region.

LINKAGE=MPD

$\psi(4415)$ MASS

NODE=M073M

NODE=M073M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
4415 ± 5 OUR AVERAGE				
4413.6± 9.0±0.8	[1] ABLIKIM	24D	BES3	$e^+e^- \to \omega\gamma J/\psi$
4414.6± 3.4±6.1	ABLIKIM	23BH	BES3	$e^+e^- \to D_s^{*+}D_s^{*-}$
4415.1± 7.9	[2] ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4412 ±15	[3] MO	10	RVUE	$e^+e^- \to$ hadrons
4411 ± 7	[4] PAKHLOVA	08A	BELL	10.6 $e^+e^- \to D^0D^-\pi^+\gamma$
4425 ± 6	[5] SETH	05A	RVUE	$e^+e^- \to$ hadrons
4429 ± 9	[6] SETH	05A	RVUE	$e^+e^- \to$ hadrons
4417 ±10	BRANDELIK	78C	DASP	e^+e^-
4414 ± 7	SIEGRIST	76	MRK1	e^+e^-

OCCUR=2

[1] Assuming one single Breit-Wigner resonance in $\omega\chi_{c2}(1P)$ ($\chi_{c2} \to \gamma J/\psi$). NODE=M073M;LINKAGE=A

[2] 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 $\delta = (234 \pm 88)^\circ$. NODE=M073M;LINKAGE=AB

[3] 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. NODE=M073M;LINKAGE=MO

[4] Systematic uncertainties not estimated. NODE=M073M;LINKAGE=NS

[5] From a fit to Crystal Ball (OSTERHELD 86) data. NODE=M073M;LINKAGE=ST

[6] From a fit to BES (BAI 02C) data. NODE=M073M;LINKAGE=SE

$\psi(4415)$ WIDTH

NODE=M073W

NODE=M073W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
110 ±13 OUR AVERAGE	Error includes scale factor of 1.6. See the ideogram below.			
110.5±15.0±2.9	[7] ABLIKIM	24D	BES3	$e^+e^- \to \omega\gamma J/\psi$
122.5± 7.5±8.1	ABLIKIM	23BH	BES3	$e^+e^- \to D_s^{*+}D_s^{*-}$
71.5±19.0	[8] ABLIKIM	08D	BES2	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
118 ±32	[9] MO	10	RVUE	$e^+e^- \to$ hadrons
77 ±20	[10] PAKHLOVA	08A	BELL	10.6 $e^+e^- \to D^0D^-\pi^+\gamma$
119 ±16	[11] SETH	05A	RVUE	$e^+e^- \to$ hadrons
118 ±35	[12] SETH	05A	RVUE	$e^+e^- \to$ hadrons
66 ±15	BRANDELIK	78C	DASP	e^+e^-
33 ±10	SIEGRIST	76	MRK1	e^+e^-

OCCUR=2

[7] Assuming one single Breit-Wigner resonance in $\omega\chi_{c2}(1P)$ ($\chi_{c2} \to \gamma J/\psi$). NODE=M073W;LINKAGE=A

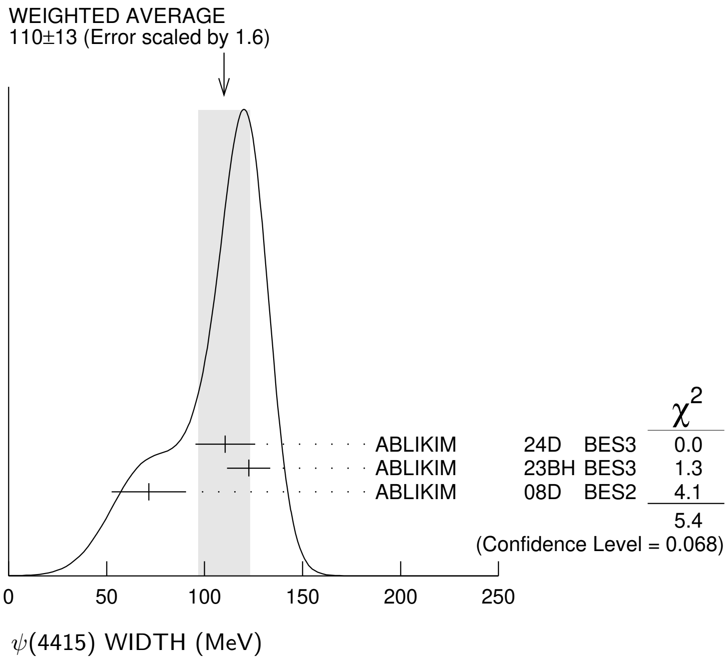
[8] Reanalysis of data presented in BAI 02C. From a global fit over the center-of-mass energy region 3.7–5.0 GeV covering the $\psi(3770)$, $\psi(4040)$, $\psi(4160)$, and $\psi(4415)$ resonances. Phase angle fixed in the fit to $\delta = (234 \pm 88)^\circ$. NODE=M073W;LINKAGE=AB

[9] 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. NODE=M073W;LINKAGE=MO

[10] Systematic uncertainties not estimated. NODE=M073W;LINKAGE=NS

[11] From a fit to Crystal Ball (OSTERHELD 86) data. NODE=M073W;LINKAGE=ST

[12] From a fit to BES (BAI 02C) data. NODE=M073W;LINKAGE=SE



$\psi(4415)$ DECAY MODES

NODE=M073215;NODE=M073

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.

NODE=M073

	Mode	Fraction (Γ_i/Γ)	Confidence level	
Γ_1	$D\overline{D}$	seen		DESIG=7;OUR EVAL;→ UNCHECKED ←
Γ_2	$D^0\overline{D}^0$	seen		DESIG=8
Γ_3	D^+D^-	seen		DESIG=9
Γ_4	$D^*\overline{D}+$ c.c.	seen		DESIG=10;OUR EVAL;→ UNCHECKED ←
Γ_5	$D^*(2007)^0\overline{D}^0+$ c.c.	seen		DESIG=11
Γ_6	$D^*(2010)^+D^-+$ c.c.	seen		DESIG=12
Γ_7	$D^*\overline{D}^*$	seen		DESIG=13;OUR EVAL;→ UNCHECKED ←
Γ_8	$D^*(2007)^0\overline{D}^*(2007)^0+$ c.c.	seen		DESIG=14
Γ_9	$D^*(2010)^+D^*(2010)^-+$ c.c.	seen		DESIG=15
Γ_{10}	$D^0D^-\pi^+$(excl. $D^*(2010)^+D^-$ +c.c.	$<$ 2.3 %	90%	DESIG=4
Γ_{11}	$D\overline{D}_2^*(2460) \to D^0D^-\pi^+$+c.c.	(10 ±4) %		DESIG=5
Γ_{12}	$D^0D^{*-}\pi^+$+c.c.	$<$ 31 %	90%	DESIG=6
Γ_{13}	$D_1(2420)\overline{D}+$ c.c.	possibly seen		DESIG=25
Γ_{14}	$D_s^+D_s^-$	not seen		DESIG=16
Γ_{15}	$\omega\chi_{c2}$	(9 ±4) $\times 10^{-3}$		DESIG=20
Γ_{16}	$D_s^{*+}D_s^-$+c.c.	seen		DESIG=17
Γ_{17}	$D_s^{*+}D_s^{*-}$	seen		DESIG=18
Γ_{18}	$\psi_2(3823)\pi^+\pi^-$	possibly seen		DESIG=21
Γ_{19}	$\psi(3770)\pi^+\pi^-$	possibly seen		DESIG=24
Γ_{20}	$J/\psi\eta$	$<$ 1.0 %	90%	DESIG=19
Γ_{21}	$\chi_{c1}\gamma$	$<$ 1.3 $\times 10^{-3}$	90%	DESIG=22
Γ_{22}	$\chi_{c2}\gamma$	$<$ 7 $\times 10^{-3}$	90%	DESIG=23
Γ_{23}	$\Lambda\overline{\Lambda}$	$<$ 5 $\times 10^{-6}$	90%	DESIG=27
Γ_{24}	$\Sigma^+\overline{\Sigma}^-$	$<$ 1.8 $\times 10^{-4}$	90%	DESIG=32
Γ_{25}	$\Sigma^0\overline{\Sigma}^0$	$<$ 4 $\times 10^{-5}$	90%	DESIG=36
Γ_{26}	$\Xi^0\overline{\Xi}^0$	$<$ 1.4 $\times 10^{-4}$	90%	DESIG=35
Γ_{27}	$\Xi^-\overline{\Xi}^+$	$<$ 6 $\times 10^{-5}$	90%	DESIG=30

Γ_{28}	$p K^- \overline{\Lambda}$ + c.c.	$< 1.0 \times 10^{-5}$	90%	DESIG=31
Γ_{29}	$\Lambda \overline{\Xi}^+ K^-$ + c.c.	$< 4 \times 10^{-5}$	90%	DESIG=33
Γ_{30}	$\Sigma^0 \overline{\Xi}^+ K^-$ + c.c.	$< 2.5 \times 10^{-4}$	90%	DESIG=34
Γ_{31}	$p K^- K^- \overline{\Xi}^+$ + c.c.	$< 8 \times 10^{-5}$	90%	DESIG=37
Γ_{32}	$\omega \pi^0$	not seen		DESIG=28
Γ_{33}	$\omega \eta$	not seen		DESIG=29
Γ_{34}	$e^+ e^-$	$(3.2 \pm 1.2) \times 10^{-6}$		DESIG=1
Γ_{35}	$\mu^+ \mu^-$	$(1.1 \pm 0.4) \times 10^{-5}$		DESIG=26

$\psi(4415)$ PARTIAL WIDTHS

NODE=M073220

$\Gamma(e^+ e^-)$ Γ_{34}

NODE=M073W1
NODE=M073W1

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.35±0.12	[13] ABLIKIM	08D	BES2	$e^+ e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.4 to 0.8	[14] MO	10	RVUE	$e^+ e^- \rightarrow$ hadrons
0.72±0.11	[15] SETH	05A	RVUE	$e^+ e^- \rightarrow$ hadrons
0.64±0.23	[16] SETH	05A	RVUE	$e^+ e^- \rightarrow$ hadrons
0.49±0.13	BRANDELIK	78C	DASP	$e^+ e^-$
0.44±0.14	SIEGRIST	76	MRK1	$e^+ e^-$

OCCUR=2

[13] 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 $\delta = (234 \pm 88)^\circ$.

NODE=M073W1;LINKAGE=AB

[14] 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.

NODE=M073W1;LINKAGE=MO

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

NODE=M073W1;LINKAGE=ST

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

NODE=M073W1;LINKAGE=SE

$\Gamma(\mu^+ \mu^-)$ Γ_{35}

NODE=M073W2
NODE=M073W2

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
1.25±0.28±0.35	[17,18] ABLIKIM	20AG	BES3	$e^+ e^- \rightarrow \mu^+ \mu^-$

[17] From a fit to the $e^+ e^- \rightarrow \mu^+ \mu^-$ cross section between 3.8 and 4.6 GeV to the coherent sum of four resonant amplitudes assuming $\Gamma(\mu^+ \mu^-) = \Gamma(e^+ e^-)$.

NODE=M073W2;LINKAGE=A

[18] From solution 1 of 8 with equal fit quality. Other solutions range from $1.24 \pm 0.28 \pm 0.35$ to $1.27 \pm 0.41 \pm 0.36$ keV.

NODE=M073W2;LINKAGE=B

$\psi(4415)$ $\Gamma(i) \times \Gamma(e^+ e^-)/\Gamma(\text{total})$

NODE=M073230

$\Gamma(\omega \chi_{c2}) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$ $\Gamma_{15}\Gamma_{34}/\Gamma$

NODE=M073R22
NODE=M073R22

VALUE (eV)	DOCUMENT ID		TECN	COMMENT
3.17±0.39±0.24	[19] ABLIKIM	24D	BES3	$e^+ e^- \rightarrow \omega \gamma J/\psi$

[19] Assuming one single Breit-Wigner resonance in $\omega \chi_{c2}(1P)$ ($\chi_{c2} \rightarrow \gamma J/\psi$).

NODE=M073R22;LINKAGE=A

$\Gamma(J/\psi \eta) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$ $\Gamma_{20}\Gamma_{34}/\Gamma$

NODE=M073G01
NODE=M073G01

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<3.6	90	WANG	13B	BELL	$e^+ e^- \rightarrow J/\psi \eta \gamma$

$\Gamma(\chi_{c1} \gamma) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$ $\Gamma_{21}\Gamma_{34}/\Gamma$

NODE=M073G02
NODE=M073G02

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<0.47	90	[20] HAN	15	BELL	10.58 $e^+ e^- \rightarrow \chi_{c1} \gamma$

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

NODE=M073G02;LINKAGE=A

$\Gamma(\chi_{c2} \gamma) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$ $\Gamma_{22}\Gamma_{34}/\Gamma$

NODE=M073G03
NODE=M073G03

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<2.3	90	[21] HAN	15	BELL	10.58 $e^+ e^- \rightarrow \chi_{c2} \gamma$

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

NODE=M073G03;LINKAGE=A

$\Gamma(\Lambda \overline{\Lambda}) \times \Gamma(e^+ e^-)/\Gamma_{\text{total}}$ $\Gamma_{23}\Gamma_{34}/\Gamma$

NODE=M073R16
NODE=M073R16

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
$<1.8 \times 10^{-3}$	90	[22] ABLIKIM	21AS	BES3	$e^+ e^- \rightarrow \psi(4415)$

[22] From a measurement of the $e^+ e^- \rightarrow \Lambda \overline{\Lambda}$ cross section between 3.5 and 4.6 GeV.

NODE=M073R16;LINKAGE=A

$\Gamma(\Sigma^+\overline{\Sigma}^-) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{24}\Gamma_{34}/\Gamma$

NODE=M073R23
NODE=M073R23

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<62.1 × 10^{-3}	90	[23] ABLIKIM	24AH	BES3	$e^+e^- \to \Sigma^+\overline{\Sigma}^-$

[23] Interference effect between resonance and continuum amplitudes is considered. Two solutions from the fit.

NODE=M073R23;LINKAGE=A

$\Gamma(\Sigma^0\overline{\Sigma}^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{25}\Gamma_{34}/\Gamma$

NODE=M073R27
NODE=M073R27

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<14.0 × 10^{-3}	90	[24] ABLIKIM	25U	BES3	$e^+e^- \to \Sigma^0\overline{\Sigma}^0$

[24] Interference effect between resonance and continuum amplitudes is considered. Upper limit is for the larger of the two solutions from the fit.

NODE=M073R27;LINKAGE=A

$\Gamma(\Xi^0\overline{\Xi}^0) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{26}\Gamma_{34}/\Gamma$

NODE=M073R26
NODE=M073R26

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<48.0 × 10^{-3}	90	[25] ABLIKIM	24CD	BES3	$e^+e^- \to \psi(4415)$

[25] From a fit to $e^+e^- \to \Xi^0\overline{\Xi}^0$ cross sections.

NODE=M073R26;LINKAGE=A

$\Gamma(\Xi^-\overline{\Xi}^+) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{27}\Gamma_{34}/\Gamma$

NODE=M073R19
NODE=M073R19

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<21.7 × 10^{-3}	90	[26] ABLIKIM	23BK	BES3	$e^+e^- \to \psi(4415)$

[26] From a fit to $e^+e^- \to \Xi^-\overline{\Xi}^+$ cross sections.

NODE=M073R19;LINKAGE=A

$\Gamma(pK^-\overline{\Lambda}+\text{c.c.}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{28}\Gamma_{34}/\Gamma$

NODE=M073R21
NODE=M073R21

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<3.4 × 10^{-3}	90	[27] ABLIKIM	23BL	BES3	$e^+e^- \to \psi(4415)$

[27] From a fit to $e^+e^- \to pK^-\overline{\Lambda}+$ c.c. cross sections.

NODE=M073R21;LINKAGE=A

$\Gamma(\Lambda\overline{\Xi}^+K^-+\text{c.c.}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{29}\Gamma_{34}/\Gamma$

NODE=M073R24
NODE=M073R24

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<14.3 × 10^{-3}	90	[28] ABLIKIM	24AL	BES3	$e^+e^- \to \Lambda\overline{\Xi}^+K^- +$ c.c.

[28] A fit to the Born cross section of $e^+e^- \to \Lambda\overline{\Xi}^+K^- +$ c.c. including interference with the continuum. Two solutions from the fit.

NODE=M073R24;LINKAGE=A

$\Gamma(\Sigma^0\overline{\Xi}^+K^-+\text{c.c.}) \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{30}\Gamma_{34}/\Gamma$

NODE=M073R25
NODE=M073R25

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<87.0 × 10^{-3}	90	[29] ABLIKIM	24AL	BES3	$e^+e^- \to \Sigma^0\overline{\Xi}^+K^- +$ c.c.

[29] A fit to the Born cross section of $e^+e^- \to \Sigma^0\overline{\Xi}^+K^- +$ c.c. including interference with the continuum. Two solutions from the fit.

NODE=M073R25;LINKAGE=A

$\Gamma(e^+e^-) \times \Gamma(pK^-K^-\overline{\Xi}^+ +\text{c.c.})/\Gamma_{total}$ — $\Gamma_{34}\Gamma_{31}/\Gamma$

NODE=M073R28
NODE=M073R28

VALUE (eV)	CL%	DOCUMENT ID		TECN	COMMENT
<29.4 × 10^{-3}	90	ABLIKIM	25CF	BES3	$e^+e^- \to pK^-K^-\overline{\Xi}^+ +$ c.c.

$\psi(4415)$ $\Gamma(i) \times \Gamma(e^+e^-)/\Gamma^2(\text{total})$

NODE=M073235

$\Gamma(D^0D^{*-}\pi^+ +\text{c.c.})/\Gamma_{total} \times \Gamma(e^+e^-)/\Gamma_{total}$ — $\Gamma_{12}/\Gamma \times \Gamma_{34}/\Gamma$

NODE=M073R01
NODE=M073R01

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.99 × 10^{-6}	90	[30] PAKHLOVA	09	BELL	$e^+e^- \to D^0D^{*-}\pi^+$

[30] Using 4421 ± 4 MeV for the mass of $\psi(4415)$.

NODE=M073R01;LINKAGE=PA

$\psi(4415)$ BRANCHING RATIOS

NODE=M073225

$\Gamma(D^0\overline{D}^0)/\Gamma_{total}$ — Γ_2/Γ

NODE=M073R04
NODE=M073R04

VALUE	DOCUMENT ID		TECN	COMMENT
seen	[31] ABLIKIM	24BH	BES3	$e^+e^- \to D^0\overline{D}^0$
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	$e^+e^- \to D^0\overline{D}^0\gamma$

[31] A precision measurement of the $e^+e^- \to D^0\overline{D}^0$ cross section shows complex structure in this mass region.

NODE=M073R04;LINKAGE=A

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

NODE=M073R05
NODE=M073R05

VALUE	DOCUMENT ID	TECN	COMMENT
seen	[32] ABLIKIM 24BH	BES3	$e^+ e^- \to D^+ D^-$
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	$e^+ e^- \to D^+ D^- \gamma$

[32] A precision measurement of the $e^+ e^- \to D^+ D^-$ cross section shows complex structure in this mass region.

NODE=M073R05;LINKAGE=A

$\Gamma(D^*(2007)^0 \overline{D}^0 + \text{c.c.})/\Gamma_{total}$ Γ_5/Γ

NODE=M073R06
NODE=M073R06

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

$\Gamma(D^*(2010)^+ D^- + \text{c.c.})/\Gamma_{total}$ Γ_6/Γ

NODE=M073R07
NODE=M073R07

VALUE	DOCUMENT ID	TECN	COMMENT
seen	[33] ZHUKOVA 18	BELL	$e^+ e^- \to D^{*+} D^- \gamma$
seen	AUBERT 09M	BABR	$e^+ e^- \to D^{*+} D^- \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
seen	PAKHLOVA 07	BELL	$e^+ e^- \to D^{*+} D^- \gamma$

[33] Supersedes PAKHLOVA 07.

NODE=M073R07;LINKAGE=A

$\Gamma(D\overline{D})/\Gamma(D^* \overline{D}^*)$ Γ_1/Γ_7

NODE=M073R02
NODE=M073R02

VALUE	DOCUMENT ID	TECN	COMMENT
0.14±0.12±0.03	AUBERT 09M	BABR	$e^+ e^- \to \gamma D^{(*)} \overline{D}^{(*)}$

$\Gamma(D^* \overline{D} + \text{c.c.})/\Gamma(D^* \overline{D}^*)$ Γ_4/Γ_7

NODE=M073R03
NODE=M073R03

VALUE	DOCUMENT ID	TECN	COMMENT
0.17±0.25±0.03	AUBERT 09M	BABR	$e^+ e^- \to \gamma D^{(*)} \overline{D}^{(*)}$

$\Gamma(D^*(2007)^0 \overline{D}^*(2007)^0 + \text{c.c.})/\Gamma_{total}$ Γ_8/Γ

NODE=M073R08
NODE=M073R08

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

$\Gamma(D^*(2010)^+ D^*(2010)^- + \text{c.c.})/\Gamma_{total}$ Γ_9/Γ

NODE=M073R09
NODE=M073R09

VALUE	DOCUMENT ID	TECN	COMMENT
seen	[34] ZHUKOVA 18	BELL	$e^+ e^- \to D^{*+} D^{*-} \gamma$
seen	AUBERT 09M	BABR	$e^+ e^- \to D^{*+} D^{*-} \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
seen	PAKHLOVA 07	BELL	$e^+ e^- \to D^{*+} D^{*-} \gamma$

[34] Supersedes PAKHLOVA 07.

NODE=M073R09;LINKAGE=A

$\Gamma(D \overline{D}_2^*(2460) \to D^0 D^- \pi^+ + \text{c.c.})/\Gamma_{total}$ Γ_{11}/Γ

NODE=M073R3
NODE=M073R3

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
10.5±2.4±3.8	[35] PAKHLOVA 08A	BELL	$10.6\ e^+ e^- \to D^0 D^- \pi^+ \gamma$

[35] Using 4421 ± 4 MeV for the mass and 62 ± 20 MeV for the width of $\psi(4415)$.

NODE=M073R3;LINKAGE=PA

$\Gamma(D^0 D^- \pi^+ (\text{excl. } D^*(2010)^+ D^- + \text{c.c.})/\Gamma(D \overline{D}_2^*(2460) \to D^0 D^- \pi^+ + \text{c.c.})$ Γ_{10}/Γ_{11}

NODE=M073R4
NODE=M073R4

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.22	90	[36] PAKHLOVA 08A	BELL	$10.6\ e^+ e^- \to D^0 D^- \pi^+ \gamma$

[36] Using 4421 ± 4 MeV for the mass and 62 ± 20 MeV for the width of $\psi(4415)$.

NODE=M073R4;LINKAGE=PA

$\Gamma(D_1(2420) \overline{D} + \text{c.c.})/\Gamma_{total}$ Γ_{13}/Γ

NODE=M073R15
NODE=M073R15

VALUE	DOCUMENT ID	TECN	COMMENT
possibly seen	[37] ABLIKIM 19AR	BES3	$e^+ e^- \to \pi^+ \pi^- D \overline{D}$

[37] Evidence for $e^+ e^- \to D_1(2420) \overline{D}$+ c.c. between $\sqrt{s}$ = 4.3 and 4.6 GeV, not necessarily resonant.

NODE=M073R15;LINKAGE=A

$\Gamma(D_s^+ D_s^-)/\Gamma_{total}$ Γ_{14}/Γ

NODE=M073R10
NODE=M073R10

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	$e^+ e^- \to D_s^+ D_s^- \gamma$

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

NODE=M073R11

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

$\Gamma(D_s^{*+} D_s^{*-})/\Gamma_{\text{total}}$ — Γ_{17}/Γ

NODE=M073R12

VALUE	DOCUMENT ID		TECN	COMMENT
seen	ABLIKIM	23BH	BES3	$e^+ e^- \rightarrow D_s^{*+} D_s^{*-}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
not seen	PAKHLOVA	11	BELL	$e^+ e^- \rightarrow D_s^{*+} D_s^{*-} \gamma$
not seen	DEL-AMO-SA...	10N	BABR	$e^+ e^- \rightarrow D_s^{*+} D_s^{*-} \gamma$

$\Gamma(\psi_2(3823)\pi^+\pi^-)/\Gamma_{\text{total}}$ — Γ_{18}/Γ

NODE=M073R13

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
possibly seen	19	[38] ABLIKIM	15S	BES3	$e^+ e^- \rightarrow \pi^+ \pi^- \chi_{c1} \gamma$

[38] From a fit of $e^+ e^- \rightarrow \pi^+ \pi^- \psi_2(3823)$, $\psi_2(3823) \rightarrow \chi_{c1} \gamma$ cross sections taken at $\sqrt{s}$ values of 4.23, 4.26, 4.36, 4.42, and 4.60 GeV to the $\psi(4415)$ line shape.

NODE=M073R13;LINKAGE=A

$\Gamma(\psi(3770)\pi^+\pi^-)/\Gamma_{\text{total}}$ — Γ_{19}/Γ

NODE=M073R14

VALUE	DOCUMENT ID		TECN	COMMENT
possibly seen	[39] ABLIKIM	19AR	BES3	$e^+ e^- \rightarrow \pi^+ \pi^- D \overline{D}$

[39] Observe $e^+ e^- \rightarrow \pi^+ \pi^- \psi(3770)$ at $\sqrt{s}$ = 4.26, 4.36, and 4.42 GeV but cannot establish if continuum or resonant.

NODE=M073R14;LINKAGE=A

$\Gamma(\omega\pi^0)/\Gamma_{\text{total}}$ — Γ_{32}/Γ

NODE=M073R17

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	ABLIKIM	22K	BES3	$e^+ e^- \rightarrow \omega \pi^0$

$\Gamma(\omega\eta)/\Gamma_{\text{total}}$ — Γ_{33}/Γ

NODE=M073R18

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	ABLIKIM	22K	BES3	$e^+ e^- \rightarrow \omega \eta$

$\psi(4415)$ REFERENCES

NODE=M073

ABLIKIM	25CF	JHEP 2511 111	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63628
ABLIKIM	25U	PR D111 L051502	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63265
ABLIKIM	24AH	JHEP 2405 022	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62688
ABLIKIM	24AL	JHEP 2407 258	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62693
ABLIKIM	24BH	PRL 133 081901	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62924
ABLIKIM	24CD	JHEP 2411 062	M. Ablikim *et al.*	(BESIII Collab.)	REFID=63037
ABLIKIM	24D	PRL 132 161901	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62653
ABLIKIM	23BH	PRL 131 151903	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62433
ABLIKIM	23BK	JHEP 2311 228	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62437
ABLIKIM	23BL	JHEP 2312 027	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62438
ABLIKIM	22K	JHEP 2207 064	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61648
ABLIKIM	21AS	PR D104 L091104	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61454
ABLIKIM	20AG	PR D102 112009	M. Ablikim *et al.*	(BESIII Collab.)	REFID=60744
ABLIKIM	19AR	PR D100 032005	M. Ablikim *et al.*	(BESIII Collab.)	REFID=59910
ZHUKOVA	18	PR D97 012002	V. Zhukova *et al.*	(BELLE Collab.)	REFID=58710
ABLIKIM	15S	PRL 115 011803	M. Ablikim *et al.*	(BESIII Collab.)	REFID=56784
HAN	15	PR D92 012011	Y.L. Han *et al.*	(BELLE Collab.)	REFID=56816
WANG	13B	PR D87 051101	X.L. Wang *et al.*	(BELLE Collab.)	REFID=55377
PAKHLOVA	11	PR D83 011101	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=53638
DEL-AMO-SA...	10N	PR D82 052004	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53532
MO	10	PR D82 077501	X.H. Mo, C.Z. Yuan, P. Wang	(BHEP)	REFID=53540
AUBERT	09M	PR D79 092001	B. Aubert *et al.*	(BABAR Collab.)	REFID=52724
PAKHLOVA	09	PR D80 091101	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=53143
ABLIKIM	08D	PL B660 315	M. Ablikim *et al.*	(BES Collab.)	REFID=52142
PAKHLOVA	08	PR D77 011103	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=52132
PAKHLOVA	08A	PRL 100 062001	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=52134
PAKHLOVA	07	PRL 98 092001	G. Pakhlova *et al.*	(BELLE Collab.)	REFID=51628
SETH	05A	PR D72 017501	K.K. Seth		REFID=50813
BAI	02C	PRL 88 101802	J.Z. Bai *et al.*	(BES Collab.)	REFID=50506
BAI	00	PRL 84 594	J.Z. Bai *et al.*	(BES Collab.)	REFID=50503
OSTERHELD	86	SLAC-PUB-4160	A. Osterheld *et al.*	(SLAC Crystal Ball Collab.)	REFID=51064
BRANDELIK	78C	PL 76B 361	R. Brandelik *et al.*	(DASP Collab.)	REFID=22232
SIEGRIST	76	PRL 36 700	J.L. Siegrist *et al.*	(LBL, SLAC)	REFID=22243