$\psi(4160)$

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

$\psi(4160)$ MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
4153± 3 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
4151± 4	[1] SETH	05A	RVUE	$e^+e^- \to$ hadrons
4155± 5	[2] SETH	05A	RVUE	$e^+e^- \to$ hadrons
4159±20	BRANDELIK	78C	DASP	e^+e^-

[1] From a fit to Crystal Ball (OSTERHELD 86) data.
[2] From a fit to BES (BAI 02C) data.

$\psi(4160)$ WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
103± 8 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
107±10	[3] SETH	05A	RVUE	$e^+e^- \to$ hadrons
107±16	[4] SETH	05A	RVUE	$e^+e^- \to$ hadrons
78±20	BRANDELIK	78C	DASP	e^+e^-

[3] From a fit to Crystal Ball (OSTERHELD 86) data.
[4] From a fit to BES (BAI 02C) data.

$\psi(4160)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)		Confidence level
Γ_1	e^+e^-	$(8.1\pm0.9)\times10^{-6}$		
Γ_2	$J/\psi\pi^+\pi^-$	< 3	$\times10^{-3}$	90%
Γ_3	$J/\psi\pi^0\pi^0$	< 3	$\times10^{-3}$	90%
Γ_4	$J/\psi K^+K^-$	< 2	$\times10^{-3}$	90%
Γ_5	$J/\psi\eta$	< 8	$\times10^{-3}$	90%
Γ_6	$J/\psi\pi^0$	< 1	$\times10^{-3}$	90%
Γ_7	$J/\psi\eta'$	< 5	$\times10^{-3}$	90%
Γ_8	$J/\psi\pi^+\pi^-\pi^0$	< 1	$\times10^{-3}$	90%
Γ_9	$\psi(2S)\pi^+\pi^-$	< 4	$\times10^{-3}$	90%
Γ_{10}	$\chi_{c1}\gamma$	< 7	$\times10^{-3}$	90%
Γ_{11}	$\chi_{c2}\gamma$	< 1.3	%	90%
Γ_{12}	$\chi_{c1}\pi^+\pi^-\pi^0$	< 2	$\times10^{-3}$	90%
Γ_{13}	$\chi_{c2}\pi^+\pi^-\pi^0$	< 8	$\times10^{-3}$	90%
Γ_{14}	$\phi\pi^+\pi^-$	< 2	$\times10^{-3}$	90%

$\psi(4160)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ Γ_1

VALUE (keV)	*DOCUMENT ID*		*TECN*	*COMMENT*
0.83±0.07 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.83±0.08	[5] SETH	05A	RVUE	$e^+e^- \to$ hadrons
0.84±0.13	[6] SETH	05A	RVUE	$e^+e^- \to$ hadrons
0.77±0.23	BRANDELIK	78C	DASP	e^+e^-

[5] From a fit to Crystal Ball (OSTERHELD 86) data.
[6] From a fit to BES (BAI 02C) data.

$\psi(4160)$ BRANCHING RATIOS

$\Gamma(J/\psi\pi^+\pi^-)/\Gamma_{total}$ Γ_2/Γ

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

$\Gamma(J/\psi\pi^0\pi^0)/\Gamma_{total}$ Γ_3/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_4/Γ

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

$\Gamma(J/\psi\eta)/\Gamma_{total}$ Γ_5/Γ

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

$\Gamma(J/\psi\pi^0)/\Gamma_{total}$ Γ_6/Γ

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

$\Gamma(J/\psi\eta')/\Gamma_{total}$ Γ_7/Γ

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

$\Gamma(J/\psi\pi^+\pi^-\pi^0)/\Gamma_{total}$ Γ_8/Γ

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

$\Gamma(\psi(2S)\pi^+\pi^-)/\Gamma_{total}$ Γ_9/Γ

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

$\Gamma(\chi_{c1}\gamma)/\Gamma_{total}$ **Γ_{10}/Γ**

VALUE (units 10^{-3})	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
<7	90	COAN	06	CLEO	4.12–4.2 e^+e^- → hadrons

$\Gamma(\chi_{c2}\gamma)/\Gamma_{total}$ **Γ_{11}/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_{12}/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_{13}/Γ**

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

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

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

$\psi(4160)$ REFERENCES

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.)
OSTERHELD	86	SLAC-PUB-4160	A. Osterheld *et al.*	(SLAC Crystal Ball Collab.)
BRANDELIK	78C	PL 76B 361	R. Brandelik *et al.*	(DASP Collab.)

OTHER RELATED PAPERS

IDDIR	98	PL B433 125	F. Iddir *et al.*	
ONO	84	ZPHY C26 307	S. Ono	(ORSAY)
BURMESTER	77	PL 66B 395	J. Burmester *et al.*	(DESY, HAMB, SIEG+)