$\Upsilon(10860)$

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

$\Upsilon(10860)$ MASS

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
10.865±0.008 OUR AVERAGE	Error includes scale factor of 1.1.			
10.868±0.006±0.005	BESSON	85	CLEO	$e^+e^- \rightarrow$ hadrons
10.845±0.020	LOVELOCK	85	CUSB	$e^+e^- \rightarrow$ hadrons

$\Upsilon(10860)$ WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
110±13 OUR AVERAGE				
112±17±23	BESSON	85	CLEO	$e^+e^- \rightarrow$ hadrons
110±15	LOVELOCK	85	CUSB	$e^+e^- \rightarrow$ hadrons

$\Upsilon(10860)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	e^+e^-	$(2.8 \pm 0.7) \times 10^{-6}$	
Γ_2	$B\overline{B}X$	(59 ± 14) %	
Γ_3	$B\overline{B}$	< 13.8 %	90%
Γ_4	$B\overline{B}^* +$ c.c.	(14 ± 6) %	
Γ_5	$B^*\overline{B}^*$	(44 ± 11) %	
Γ_6	$B\overline{B}^{(*)}\pi$	< 19.7 %	90%
Γ_7	$B\overline{B}\pi\pi$	< 8.9 %	90%
Γ_8	$B_s^{(*)}\overline{B}_s^{(*)}(X)$	$(19.5^{+3.0}_{-2.3})$ %	
Γ_9	$B_s\overline{B}_s$		
Γ_{10}	$B_s\overline{B}_s^* +$ c.c.		
Γ_{11}	$B_s^*\overline{B}_s^*$		

Inclusive Decays.

These decay modes are submodes of one or more of the decay modes above.

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_{12}	ϕ anything	$(13.8^{+2.4}_{-1.7})$ %	
Γ_{13}	D^0 anything + c.c.	(108 ± 8) %	
Γ_{14}	D_s anything + c.c.	(46 ± 6) %	
Γ_{15}	J/ψ anything	(2.06 ± 0.21) %	

$\Upsilon(10860)$ PARTIAL WIDTHS

$\Gamma(e^+e^-)$ Γ_1

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.31 ±0.07 OUR AVERAGE	Error includes scale factor of 1.3.			
0.22 ±0.05 ±0.07	BESSON	85	CLEO	$e^+e^- \rightarrow$ hadrons
0.365±0.070	LOVELOCK	85	CUSB	$e^+e^- \rightarrow$ hadrons

$\Upsilon(10860)$ BRANCHING RATIOS

$\Gamma(B\overline{B}X)/\Gamma_{total}$ Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.589±0.100±0.092	[1] HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B})/\Gamma_{total}$ Γ_3/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.138	90	[1] HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B})/\Gamma(B\overline{B}X)$ Γ_3/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.22	90	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B}^* + \text{c.c.})/\Gamma_{total}$ Γ_4/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.143±0.053±0.027	[1] HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B}^* + \text{c.c.})/\Gamma(B\overline{B}X)$ Γ_4/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.24±0.09±0.03	10	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B^*\overline{B}^*)/\Gamma_{total}$ Γ_5/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.436±0.083±0.072	[1] HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B^*\overline{B}^*)/\Gamma(B\overline{B}X)$ Γ_5/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.74±0.15±0.08	31	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B}^{(*)}\pi)/\Gamma_{total}$ Γ_6/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.197	90	[1] HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B}^{(*)}\pi)/\Gamma(B\overline{B}X)$ Γ_6/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.32	90	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B}\pi\pi)/\Gamma_{total}$ Γ_7/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.089	90	[1] HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\overline{B}\pi\pi)/\Gamma(B\overline{B}X)$ $\qquad\Gamma_7/\Gamma_2$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.14	90	AQUINES	06	CLE3	$\Upsilon(5S) \to$ hadrons

$\Gamma(B_s^{(*)}\overline{B}_s^{(*)}(X))/\Gamma_{total}$ $\qquad\Gamma_8/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.195^{+0.030}_{-0.023}}$ **OUR AVERAGE**				
$0.180\pm0.013\pm0.032$	[2] DRUTSKOY	07	BELL	$\Upsilon(5S) \to D^0 X$, $D_s X$
$0.21\ ^{+0.06}_{-0.03}$	[3] HUANG	07	CLEO	$\Upsilon(5S) \to D_s X$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.160\pm0.026\pm0.058$	[4] ARTUSO	05B	CLEO	$e^+e^- \to D_x X$

$\Gamma(B_s\overline{B}_s)/\Gamma(B_s^*\overline{B}_s^*)$ $\qquad\Gamma_9/\Gamma_{11}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.16	90	BONVICINI	06	CLE3	e^+e^-

$\Gamma(B_s\overline{B}_s^* + \text{c.c.})/\Gamma(B_s^*\overline{B}_s^*)$ $\qquad\Gamma_{10}/\Gamma_{11}$

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.16	90	BONVICINI	06	CLE3	e^+e^-

$\Gamma(\phi\ \text{anything})/\Gamma_{total}$ $\qquad\Gamma_{12}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.138\pm0.007^{+0.023}_{-0.015}}$	HUANG	07	CLEO	$\Upsilon(5S) \to \phi X$

$\Gamma(D^0\ \text{anything} + \text{c.c.})/\Gamma_{total}$ $\qquad\Gamma_{13}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.076\pm0.040\pm0.068}$	DRUTSKOY	07	BELL	$\Upsilon(5S) \to D^0 X$

$\Gamma(D_s\ \text{anything} + \text{c.c.})/\Gamma_{total}$ $\qquad\Gamma_{14}/\Gamma$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.46\pm0.06}$ **OUR AVERAGE**				
$0.472\pm0.024\pm0.072$	[2] DRUTSKOY	07	BELL	$\Upsilon(5S) \to D_s X$
$0.44\pm0.09\pm0.04$	[5] ARTUSO	05B	CLE3	$e^+e^- \to D_x X$

$\Gamma(J/\psi\ \text{anything})/\Gamma_{total}$ $\qquad\Gamma_{15}/\Gamma$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.060\pm0.160\pm0.134}$	DRUTSKOY	07	BELL	$\Upsilon(5S) \to J/\psi X$

[1] Using measurements or limits from AQUINES 06.

[2] Using B($D_s^+ \to \phi\pi^+$) = (4.4 ± 0.6)% from PDG 06.

[3] Supersedes ARTUSO 05B. Combining inclusive ϕ, D_s, and B measurements. Using B($D_s^+ \to \phi\pi^+$) = 4.4 ± 0.6% from PDG 06.

[4] Uses a model-dependent estimate B($B_s \to D_s X$) = (92 ± 11)%.

[5] ARTUSO 05B reports [B($\Upsilon(10860) \to D_s$ anything + c.c.) × B($D_s^+ \to \phi\pi^+$)] = $0.0198 \pm 0.0019 \pm 0.0038$. We divide by our best value B($D_s^+ \to \phi\pi^+$) = $(4.5 \pm 0.4) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

Υ(10860) REFERENCES

DRUTSKOY	07	PRL 98 052001	A. Drutskoy *et al.*	(BELLE Collab.)
HUANG	07	PR D75 012002	G.S. Huang *et al.*	(CLEO Collab.)
AQUINES	06	PRL 96 152001	O. Aquines *et al.*	(CLEO Collab.)
BONVICINI	06	PRL 96 022002	G. Bonvicini *et al.*	(CLEO Collab.)
PDG	06	JPG 33 1	W.-M. Yao *et al.*	(PDG Collab.)
ARTUSO	05B	PRL 95 261801	M. Artuso *et al.*	(CLEO Collab.)
BESSON	85	PRL 54 381	D. Besson *et al.*	(CLEO Collab.)
LOVELOCK	85	PRL 54 377	D.M.J. Lovelock *et al.*	(CUSB Collab.)