

$\Upsilon(10860)$

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

$\Upsilon(10860)$ MASS

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

$\Upsilon(10860)$ WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
110 ± 13 OUR AVERAGE			
112 ± 17 ± 23	BESSION	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 $B\bar{B}X$	$(59 \pm 14) \%$	
Γ_3 $B\bar{B}$	< 13.8	90%
Γ_4 $B\bar{B}^* + \text{c.c.}$	$(14 \pm 6) \%$	
Γ_5 $B^*\bar{B}^*$	$(44 \pm 11) \%$	
Γ_6 $B\bar{B}^{(*)}\pi$	< 19.7	90%
Γ_7 $B\bar{B}\pi\pi$	< 8.9	90%
Γ_8 $B_s^{(*)}\bar{B}_s^{(*)}(X)$	$(19.5 \begin{smallmatrix} + 3.0 \\ - 2.3 \end{smallmatrix}) \%$	
Γ_9 $B_s\bar{B}_s$		
Γ_{10} $B_s\bar{B}_s^* + \text{c.c.}$		
Γ_{11} $B_s^*\bar{B}_s^*$		

Inclusive Decays.

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

Γ_{12} ϕ anything	$(13.8 \begin{smallmatrix} + 2.4 \\ - 1.7 \end{smallmatrix}) \%$
Γ_{13} D^0 anything + c.c.	$(108 \pm 8) \%$
Γ_{14} D_s anything + c.c.	$(46 \pm 6) \%$
Γ_{15} J/ψ anything	$(2.06 \pm 0.21) \%$

$\Upsilon(10860)$ 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

$\Gamma(B\bar{B}X)/\Gamma_{\text{total}}$					Γ_2/Γ
VALUE		DOCUMENT ID	TECN	COMMENT	
0.589 ± 0.100 ± 0.092		¹ HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B})/\Gamma_{\text{total}}$					Γ_3/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.138	90	¹ HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B})/\Gamma(B\bar{B}X)$					Γ_3/Γ_2
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.22	90	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B}^* + \text{c.c.})/\Gamma_{\text{total}}$					Γ_4/Γ
VALUE		DOCUMENT ID	TECN	COMMENT	
0.143 ± 0.053 ± 0.027		¹ HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B}^* + \text{c.c.})/\Gamma(B\bar{B}X)$					Γ_4/Γ_2
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
0.24 ± 0.09 ± 0.03	10	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B^*\bar{B}^*)/\Gamma_{\text{total}}$					Γ_5/Γ
VALUE		DOCUMENT ID	TECN	COMMENT	
0.436 ± 0.083 ± 0.072		¹ HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B^*\bar{B}^*)/\Gamma(B\bar{B}X)$					Γ_5/Γ_2
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
0.74 ± 0.15 ± 0.08	31	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B}^{(*)}\pi)/\Gamma_{\text{total}}$					Γ_6/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.197	90	¹ HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B}^{(*)}\pi)/\Gamma(B\bar{B}X)$					Γ_6/Γ_2
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.32	90	AQUINES	06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B}\pi\pi)/\Gamma_{\text{total}}$					Γ_7/Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.089	90	¹ HUANG	07	CLEO	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B\bar{B}\pi\pi)/\Gamma(B\bar{B}X)$		Γ_7/Γ_2		
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.14	90	AQUINES 06	CLE3	$\Upsilon(5S) \rightarrow$ hadrons

$\Gamma(B_s^{(*)}\bar{B}_s^{(*)}(X))/\Gamma_{\text{total}}$		Γ_8/Γ		
VALUE		DOCUMENT ID	TECN	COMMENT

0.195^{+0.030}_{-0.023} OUR AVERAGE

0.180 ± 0.013 ± 0.032	² DRUTSKOY 07	BELL	$\Upsilon(5S) \rightarrow D^0 X, D_s X$
0.21 ^{+0.06} _{-0.03}	³ HUANG 07	CLEO	$\Upsilon(5S) \rightarrow D_s X$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.160 ± 0.026 ± 0.058	⁴ ARTUSO 05B	CLEO	$e^+ e^- \rightarrow D_X X$

$\Gamma(B_s\bar{B}_s)/\Gamma(B_s^*\bar{B}_s^*)$		Γ_9/Γ_{11}		
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.16	90	BONVICINI 06	CLE3	$e^+ e^-$

$\Gamma(B_s\bar{B}_s^* + \text{c.c.})/\Gamma(B_s^*\bar{B}_s^*)$		Γ_{10}/Γ_{11}		
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.16	90	BONVICINI 06	CLE3	$e^+ e^-$

$\Gamma(\phi \text{ anything})/\Gamma_{\text{total}}$		Γ_{12}/Γ		
VALUE		DOCUMENT ID	TECN	COMMENT
0.138 ± 0.007^{+0.023}_{-0.015}		HUANG 07	CLEO	$\Upsilon(5S) \rightarrow \phi X$

$\Gamma(D^0 \text{ anything} + \text{c.c.})/\Gamma_{\text{total}}$		Γ_{13}/Γ		
VALUE		DOCUMENT ID	TECN	COMMENT
1.076 ± 0.040 ± 0.068		DRUTSKOY 07	BELL	$\Upsilon(5S) \rightarrow D^0 X$

$\Gamma(D_s \text{ anything} + \text{c.c.})/\Gamma_{\text{total}}$		Γ_{14}/Γ		
VALUE		DOCUMENT ID	TECN	COMMENT
0.46 ± 0.06 OUR AVERAGE				
0.472 ± 0.024 ± 0.072	² DRUTSKOY 07	BELL	$\Upsilon(5S) \rightarrow D_s X$	
0.44 ± 0.09 ± 0.04	⁵ ARTUSO 05B	CLE3	$e^+ e^- \rightarrow D_X X$	

$\Gamma(J/\psi \text{ anything})/\Gamma_{\text{total}}$		Γ_{15}/Γ		
VALUE (units 10 ⁻²)		DOCUMENT ID	TECN	COMMENT
2.060 ± 0.160 ± 0.134		DRUTSKOY 07	BELL	$\Upsilon(5S) \rightarrow J/\psi X$

¹ Using measurements or limits from AQUINES 06.

² Using $B(D_s^+ \rightarrow \phi\pi^+) = (4.4 \pm 0.6)\%$ from PDG 06.

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

⁴ Uses a model-dependent estimate $B(B_s \rightarrow D_s X) = (92 \pm 11)\%$.

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

$\Upsilon(10860)$ REFERENCES

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