Meson Full Listings

$\Upsilon(3S) = \Upsilon(10355)$

$\Upsilon(3S)$ or $\Upsilon(10355)$

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

$\Upsilon(3S)$ MASS

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
10.3553 ± 0.0005	[1] BARU	86B	REDE	$e^+e^- \to$ hadrons

[1] Reanalysis of ARTAMONOV 84.

$\Upsilon(3S)$ WIDTH

VALUE (keV)	DOCUMENT ID
26.3 ± 3.5 OUR EVALUATION	See Υ mini-review.

$\Upsilon(3S)$ DECAY MODES

	Mode	Fraction (Γ_j/Γ)	Scale factor
Γ_1	$\Upsilon(2S)$ anything	(10.6 ± 0.8) %	
Γ_2	$\Upsilon(2S)\pi^+\pi^-$	(2.8 ± 0.6) %	2.2
Γ_3	$\Upsilon(2S)\pi^0\pi^0$	(2.00 ± 0.32) %	
Γ_4	$\Upsilon(2S)\gamma\gamma$	(5.0 ± 0.7) %	
Γ_5	$\Upsilon(1S)\pi^+\pi^-$	(4.48 ± 0.21) %	
Γ_6	$\Upsilon(1S)\pi^0\pi^0$	(2.06 ± 0.28) %	
Γ_7	$\Upsilon(1S)\eta$		
Γ_8	$\mu^+\mu^-$	(1.81 ± 0.17) %	
Γ_9	e^+e^-	seen	
	Radiative decays		
Γ_{10}	$\gamma\chi_{b2}(2P)$	(11.4 ± 0.8) %	1.3
Γ_{11}	$\gamma\chi_{b1}(2P)$	(11.3 ± 0.6) %	
Γ_{12}	$\gamma\chi_{b0}(2P)$	(5.4 ± 0.6) %	1.1

$\Upsilon(3S)$ $\Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$\Gamma(\text{hadrons}) \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$ $\Gamma_0\Gamma_9/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.45 ± 0.03 ± 0.03	[2] GILES	84B	CLEO	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.39 ± 0.02 ± 0.03	[2] TUTS	83	CUSB	$e^+e^- \to$ hadrons

[2] Radiative corrections reevaluated by BUCHMUELLER 88 following KURAEV 85.

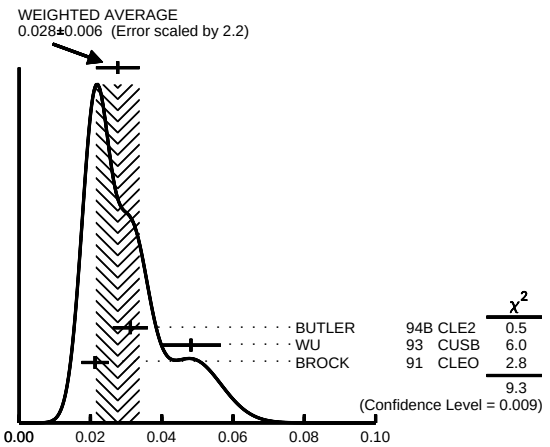
$\Upsilon(3S)$ BRANCHING RATIOS

$\Gamma(\Upsilon(2S)\text{anything})/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.106 ± 0.008 OUR AVERAGE					
0.1023 ± 0.0105	4625	[3,4,5] BUTLER	94B	CLE2	$e^+e^- \to \ell^+\ell^-$ X
0.111 ± 0.012	4891	[4,5,6] BROCK	91	CLEO	$e^+e^- \to \pi^+\pi^-$X, $\pi^+\pi^-\ell^+\ell^-$

$\Gamma(\Upsilon(2S)\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.028 ± 0.006 OUR AVERAGE	Error includes scale factor of 2.2. See the ideogram below.				
0.0312 ± 0.0049	980	[3,7] BUTLER	94B	CLE2	$e^+e^- \to \pi^+\pi^-\ell^+\ell^-$
0.0482 ± 0.0065 ± 0.0053	138	[6] WU	93	CUSB	$\Upsilon(3S) \to \pi^+\pi^-\ell^+\ell^-$
0.0213 ± 0.0038	974	[6] BROCK	91	CLEO	$e^+e^- \to \pi^+\pi^-$X, $\pi^+\pi^-\ell^+\ell^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.031 ± 0.020	5	MAGERAS	82	CUSB	$\Upsilon(3S) \to \pi^+\pi^-\ell^+\ell^-$



$\Gamma(\Upsilon(2S)\pi^+\pi^-)/\Gamma_{\text{total}}$

$\Gamma(\Upsilon(2S)\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_3/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0200 ± 0.0032 OUR AVERAGE					
0.0216 ± 0.0039		[7,8] BUTLER	94B	CLE2	$e^+e^- \to \ell^+\ell^-\pi^0\pi^0$
0.017 ± 0.005 ± 0.002	10	[9] HEINTZ	92	CSB2	$e^+e^- \to \ell^+\ell^-\pi^0\pi^0$

$\Gamma(\Upsilon(2S)\gamma\gamma)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.0502 ± 0.0069	[7] BUTLER	94B	CLE2	$e^+e^- \to \ell^+\ell^-2\gamma$

$\Gamma(\Upsilon(1S)\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0448 ± 0.0021 OUR AVERAGE					
0.0452 ± 0.0035	11830	[4] BUTLER	94B	CLE2	$e^+e^- \to \pi^+\pi^-$X, $\pi^+\pi^-\ell^+\ell^-$
0.0446 ± 0.0034 ± 0.0050	451	[4] WU	93	CUSB	$\Upsilon(3S) \to \pi^+\pi^-\ell^+\ell^-$
0.0446 ± 0.0030	11221	[4] BROCK	91	CLEO	$e^+e^- \to \pi^+\pi^-$X, $\pi^+\pi^-\ell^+\ell^-$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.049 ± 0.010	22	GREEN	82	CLEO	$\Upsilon(3S) \to \pi^+\pi^-\ell^+\ell^-$
0.039 ± 0.013	26	MAGERAS	82	CUSB	$\Upsilon(3S) \to \pi^+\pi^-\ell^+\ell^-$

$\Gamma(\Upsilon(1S)\pi^0\pi^0)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0206 ± 0.0028 OUR AVERAGE					
0.0199 ± 0.0034	56	[4] BUTLER	94B	CLE2	$e^+e^- \to \ell^+\ell^-\pi^0\pi^0$
0.022 ± 0.004 ± 0.003	33	[10] HEINTZ	92	CSB2	$e^+e^- \to \ell^+\ell^-\pi^0\pi^0$

$\Gamma(\Upsilon(1S)\eta)/\Gamma_{\text{total}}$ Γ_7/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
< 0.0022	90	BROCK	91	CLEO	$e^+e^- \to \pi^+\pi^-\pi^0\ell^+\ell^-$

$\Gamma(\mu^+\mu^-)/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0181 ± 0.0017 OUR AVERAGE					
0.0202 ± 0.0019 ± 0.0033		CHEN	89B	CLEO	$e^+e^- \to \mu^+\mu^-$
0.0173 ± 0.0015 ± 0.0011		KAARSBERG	89	CSB2	$e^+e^- \to \mu^+\mu^-$
0.033 ± 0.013 ± 0.007	1096	ANDREWS	83	CLEO	$e^+e^- \to \mu^+\mu^-$

$\Gamma(\gamma\chi_{b2}(2P))/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.114 ± 0.008 OUR AVERAGE	Error includes scale factor of 1.3.				
0.111 ± 0.005 ± 0.004	10319 ± 478	[11] HEINTZ	92	CSB2	$e^+e^- \to \gamma$
0.135 ± 0.003 ± 0.017	30741 ± 560	MORRISON	91	CLE2	$e^+e^- \to \gamma$X

$\Gamma(\gamma\chi_{b1}(2P))/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.113 ± 0.006 OUR AVERAGE					
0.115 ± 0.005 ± 0.005	11147 ± 462	[11] HEINTZ	92	CSB2	$e^+e^- \to \gamma$
$0.105^{+0.003}_{-0.002} \pm 0.013$	25759 ± 510	MORRISON	91	CLE2	$e^+e^- \to \gamma$X