

$\Upsilon(10753)$

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

OMITTED FROM SUMMARY TABLE

A candidate for $\Upsilon(3D)$ state or an exotic structure.

Seen by MIZUK 19 in $e^+e^- \rightarrow \Upsilon(nS)\pi^+\pi^-$ ($n=1,2,3$) with a significance of 5.2σ .

$\Upsilon(10753)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$10752.7 \pm 5.9^{+0.7}_{-1.1}$	¹ MIZUK	19	BELL $e^+e^- \rightarrow \Upsilon(nS)\pi^+\pi^-$
10761 ± 2	² DONG	20A	$e^+e^- \rightarrow b\bar{b}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

¹From a simultaneous fit to the $\Upsilon(nS)\pi^+\pi^-$, $n = 1, 2, 3$, cross sections at 28 energy points within $\sqrt{s} = 10.63\text{--}11.02$ GeV, including the initial-state radiation at $\Upsilon(10860)$.

²From a fit to the dressed cross sections of AUBERT 09E by BaBar and SANTEL 16 by Belle above 10.68 GeV with a coherent sum of a continuum amplitude and three Breit-Wigner functions with constant widths.

$\Upsilon(10753)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
$35.5^{+17.6+3.9}_{-11.3-3.3}$	¹ MIZUK	19	BELL $e^+e^- \rightarrow \Upsilon(nS)\pi^+\pi^-$
48.5 ± 3.0	² DONG	20A	$e^+e^- \rightarrow b\bar{b}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

¹From a simultaneous fit to the $\Upsilon(nS)\pi^+\pi^-$, $n = 1, 2, 3$, cross sections at 28 energy points within $\sqrt{s} = 10.63\text{--}11.02$ GeV, including the initial-state radiation at $\Upsilon(10860)$.

²From a fit to the dressed cross sections of AUBERT 09E by BaBar and SANTEL 16 by Belle above 10.68 GeV with a coherent sum of a continuum amplitude and three Breit-Wigner functions with constant widths.

$\Upsilon(10753)$ DECAY MODES

Mode
$\Gamma_1 \quad \Upsilon(1S)\pi^+\pi^-$
$\Gamma_2 \quad \Upsilon(2S)\pi^+\pi^-$
$\Gamma_3 \quad \Upsilon(3S)\pi^+\pi^-$
$\Gamma_4 \quad e^+e^-$

$\Upsilon(10753) \Gamma(i)\Gamma(e^+e^-)/\Gamma(\text{total})$

$$\Gamma(\Upsilon(1S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}} \quad \Gamma_1\Gamma_4/\Gamma$$

VALUE (eV) _____ DOCUMENT ID _____ TECN _____ COMMENT _____

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.295±0.175 1,2 MIZUK 19 BELL $e^+e^- \rightarrow \Upsilon(nS)\pi^+\pi^-$

¹ From a simultaneous fit to the $\Upsilon(nS)\pi^+\pi^-$, $n = 1, 2, 3$, cross sections at 28 energy points within $\sqrt{s} = 10.63\text{--}11.02$ GeV, including the initial-state radiation at $\Upsilon(10860)$.

² Reported as the range 0.12–0.47 eV obtained from multiple solutions of an amplitude fit within a model composed as a sum of Breit-Wigner functions.

$$\Gamma(\Upsilon(2S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}} \quad \Gamma_2\Gamma_4/\Gamma$$

VALUE (eV) _____ DOCUMENT ID _____ TECN _____ COMMENT _____

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.875±0.345 1,2 MIZUK 19 BELL $e^+e^- \rightarrow \Upsilon(nS)\pi^+\pi^-$

¹ From a simultaneous fit to the $\Upsilon(nS)\pi^+\pi^-$, $n = 1, 2, 3$, cross sections at 28 energy points within $\sqrt{s} = 10.63\text{--}11.02$ GeV, including the initial-state radiation at $\Upsilon(10860)$.

² Reported as the range 0.53–1.22 eV obtained from multiple solutions of an amplitude fit within a model composed as a sum of Breit-Wigner functions.

$$\Gamma(\Upsilon(3S)\pi^+\pi^-) \times \Gamma(e^+e^-)/\Gamma_{\text{total}} \quad \Gamma_3\Gamma_4/\Gamma$$

VALUE (eV) _____ DOCUMENT ID _____ TECN _____ COMMENT _____

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.235±0.025 1,2 MIZUK 19 BELL $e^+e^- \rightarrow \Upsilon(nS)\pi^+\pi^-$

¹ From a simultaneous fit to the $\Upsilon(nS)\pi^+\pi^-$, $n = 1, 2, 3$, cross sections at 28 energy points within $\sqrt{s} = 10.63\text{--}11.02$ GeV, including the initial-state radiation at $\Upsilon(10860)$.

² Reported as the range 0.21–0.26 eV obtained from multiple solutions of an amplitude fit within a model composed as a sum of Breit-Wigner functions.

$\Upsilon(10753)$ REFERENCES

DONG	20A	CP C44 083001	X.-K. Dong <i>et al.</i>	
MIZUK	19	JHEP 1910 220	R. Mizuk <i>et al.</i>	(BELLE Collab.)
SANTEL	16	PR D93 011101	D. Santel <i>et al.</i>	(BELLE Collab.)
AUBERT	09E	PRL 102 012001	B. Aubert <i>et al.</i>	(BABAR Collab.)