

**X(10610)<sup>±</sup>**

$$I^G(J^P) = 1^+(1^+)$$

Observed by BONDAR 12 in  $\Upsilon(5S)$  decays to  $\Upsilon(nS)\pi^+\pi^-$  ( $n = 1, 2, 3$ ) and  $h_b(mP)\pi^+\pi^-$  ( $m = 1, 2$ ).  $J^P = 1^+$  is favored from angular analyses. Isospin = 1 is favored due to observation by KROKOVNY 13 of a corresponding neutral state produced in  $\Upsilon(10860) \rightarrow \Upsilon(2S)/\Upsilon(3S)\pi^0\pi^0$  decays at a consistent mass.

**X(10610)<sup>±</sup> MASS**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>10607.2 ± 2.0</b>	<sup>1</sup> BONDAR	12	BELL $e^+e^- \rightarrow$ hadrons
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
10608.5 ± 3.4 <sup>+3.7</sup> <sub>-1.4</sub>	<sup>2</sup> GARMASH	15	BELL $e^+e^- \rightarrow \Upsilon(1S)\pi^+\pi^-$
10608.1 ± 1.2 <sup>+1.5</sup> <sub>-0.2</sub>	<sup>2</sup> GARMASH	15	BELL $e^+e^- \rightarrow \Upsilon(2S)\pi^+\pi^-$
10607.4 ± 1.5 <sup>+0.8</sup> <sub>-0.2</sub>	<sup>2</sup> GARMASH	15	BELL $e^+e^- \rightarrow \Upsilon(3S)\pi^+\pi^-$
10611 ± 4 ± 3	<sup>3</sup> BONDAR	12	BELL $e^+e^- \rightarrow \Upsilon(1S)\pi^+\pi^-$
10609 ± 2 ± 3	<sup>3</sup> BONDAR	12	BELL $e^+e^- \rightarrow \Upsilon(2S)\pi^+\pi^-$
10608 ± 2 ± 3	<sup>3</sup> BONDAR	12	BELL $e^+e^- \rightarrow \Upsilon(3S)\pi^+\pi^-$
10605 ± 2 <sup>+3</sup> <sub>-1</sub>	<sup>3</sup> BONDAR	12	BELL $e^+e^- \rightarrow h_b(1P)\pi^+\pi^-$
10599 <sup>+6</sup> <sub>-3</sub> <sup>+5</sup> <sub>-4</sub>	<sup>3</sup> BONDAR	12	BELL $e^+e^- \rightarrow h_b(2P)\pi^+\pi^-$

<sup>1</sup> Average of the BONDAR 12 measurements in separate channels.

<sup>2</sup> Correlated with the corresponding result from BONDAR 12.

<sup>3</sup> Superseded by the average measurement of BONDAR 12.

**X(10610)<sup>±</sup> WIDTH**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>18.4 ± 2.4</b>	<sup>4</sup> BONDAR	12	BELL $e^+e^- \rightarrow$ hadrons
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
18.5 ± 5.3 <sup>+6.1</sup> <sub>-2.3</sub>	<sup>5</sup> GARMASH	15	BELL $e^+e^- \rightarrow \Upsilon(1S)\pi^+\pi^-$
20.8 ± 2.5 <sup>+0.3</sup> <sub>-2.1</sub>	<sup>5</sup> GARMASH	15	BELL $e^+e^- \rightarrow \Upsilon(2S)\pi^+\pi^-$
18.7 ± 3.4 <sup>+2.5</sup> <sub>-1.3</sub>	<sup>5</sup> GARMASH	15	BELL $e^+e^- \rightarrow \Upsilon(3S)\pi^+\pi^-$
22.3 ± 7.7 <sup>+3.0</sup> <sub>-4.0</sub>	<sup>6</sup> BONDAR	12	BELL $e^+e^- \rightarrow \Upsilon(1S)\pi^+\pi^-$
24.2 ± 3.1 <sup>+2.0</sup> <sub>-3.0</sub>	<sup>6</sup> BONDAR	12	BELL $e^+e^- \rightarrow \Upsilon(2S)\pi^+\pi^-$
17.6 ± 3.0 ± 3.0	<sup>6</sup> BONDAR	12	BELL $e^+e^- \rightarrow \Upsilon(3S)\pi^+\pi^-$
11.4 <sup>+4.5</sup> <sub>-3.9</sub> <sup>+2.1</sup> <sub>-1.2</sub>	<sup>6</sup> BONDAR	12	BELL $e^+e^- \rightarrow h_b(1P)\pi^+\pi^-$
13 <sup>+10</sup> <sub>-8</sub> <sup>+9</sup> <sub>-7</sub>	<sup>6</sup> BONDAR	12	BELL $e^+e^- \rightarrow h_b(2P)\pi^+\pi^-$

<sup>4</sup> Average of the BONDAR 12 measurements in separate channels.<sup>5</sup> Correlated with the corresponding result from BONDAR 12.<sup>6</sup> Superseded by the average measurement of BONDAR 12. **$X(10610)^+$  DECAY MODES** $X(10610)^-$  decay modes are charge conjugates of the modes below.

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1$ $\gamma(1S)\pi^+$	seen
$\Gamma_2$ $\gamma(2S)\pi^+$	seen
$\Gamma_3$ $\gamma(3S)\pi^+$	seen
$\Gamma_4$ $h_b(1P)\pi^+$	seen
$\Gamma_5$ $h_b(2P)\pi^+$	seen

 **$X(10610)^\pm$  BRANCHING RATIOS**

$\Gamma(\gamma(1S)\pi^+)/\Gamma_{\text{total}}$				$\Gamma_1/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
seen	GARMASH 15	BELL	$e^+e^- \rightarrow \gamma(1S)\pi^+\pi^-$	
<b>seen</b>	BONDAR 12	BELL	$e^+e^- \rightarrow \gamma(1S)\pi^+\pi^-$	
$\Gamma(\gamma(2S)\pi^+)/\Gamma_{\text{total}}$				$\Gamma_2/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
seen	GARMASH 15	BELL	$e^+e^- \rightarrow \gamma(2S)\pi^+\pi^-$	
<b>seen</b>	BONDAR 12	BELL	$e^+e^- \rightarrow \gamma(2S)\pi^+\pi^-$	
$\Gamma(\gamma(3S)\pi^+)/\Gamma_{\text{total}}$				$\Gamma_3/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
seen	GARMASH 15	BELL	$e^+e^- \rightarrow \gamma(3S)\pi^+\pi^-$	
<b>seen</b>	BONDAR 12	BELL	$e^+e^- \rightarrow \gamma(3S)\pi^+\pi^-$	
$\Gamma(h_b(1P)\pi^+)/\Gamma_{\text{total}}$				$\Gamma_4/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b>seen</b>	BONDAR 12	BELL	$e^+e^- \rightarrow h_b(1P)\pi^+\pi^-$	
$\Gamma(h_b(2P)\pi^+)/\Gamma_{\text{total}}$				$\Gamma_5/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>	
<b>seen</b>	BONDAR 12	BELL	$e^+e^- \rightarrow h_b(2P)\pi^+\pi^-$	

 **$X(10610)^\pm$  REFERENCES**

GARMASH	15	PR D91 072003	A. Garmash <i>et al.</i>	(BELLE Collab.)
KROKOVNY	13	PR D88 052016	P. Krokovny <i>et al.</i>	(BELLE Collab.)
BONDAR	12	PRL 108 122001	A. Bondar <i>et al.</i>	(BELLE Collab.)