

## OTHER MESONS

 **$T_{c\bar{c}1}(3900)$** 

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

was  $Z_c(3900)$ ,  $X(3900)$

Mass  $m = 3887.1 \pm 2.6$  MeV (S = 1.7)

Full width  $\Gamma = 28.4 \pm 2.6$  MeV

NODE=MXXX050

NODE=M210

NODE=M210M;DTYPE=M

NODE=M210W;DTYPE=G

 **$T_{c\bar{c}1}(3900)$  DECAY MODES**

Fraction ( $\Gamma_i/\Gamma$ )

$p$  (MeV/c)

$J/\psi\pi$	seen	699
$h_c\pi^\pm$	not seen	318
$\eta_c\pi^+\pi^-$	not seen	758
$\eta_c(1S)\rho(770)^\pm$	seen	—
$(D\bar{D}^*)^\pm$	seen	—
$D^0 D^{*-} + \text{c.c.}$	seen	152
$D^- D^{*0} + \text{c.c.}$	seen	143
$\omega\pi^\pm$	not seen	1862
$J/\psi\eta$	not seen	510
$D^+ D^{*-} + \text{c.c.}$	seen	—
$D^0 \bar{D}^{*0} + \text{c.c.}$	seen	—

NODE=M210215;DESIG=1

DESIG=2

DESIG=10

DESIG=11;OUR EVAL; $\rightarrow$  UNCHECKED  $\leftarrow$

DESIG=3;OUR EVAL; $\rightarrow$  UNCHECKED  $\leftarrow$

DESIG=8

DESIG=9

DESIG=4

DESIG=5

DESIG=6

DESIG=7

 **$T_{c\bar{c}}(4020)$** 

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

was  $X(4020)$

Mass  $m = 4024.1 \pm 1.9$  MeV

Full width  $\Gamma = 13 \pm 5$  MeV (S = 1.7)

NODE=M213

NODE=M213M;DTYPE=M

NODE=M213W;DTYPE=G

 **$T_{c\bar{c}}(4020)$  DECAY MODES**

Fraction ( $\Gamma_i/\Gamma$ )

$p$  (MeV/c)

$h_c(1P)\pi$	seen	450
$D^*\bar{D}^*$	seen	85
$D\bar{D}^* + \text{c.c.}$	not seen	542
$\eta_c\pi^+\pi^-$	not seen	872
$J/\psi(1S)\pi^\pm$	not seen	811

NODE=M213215;DESIG=1

DESIG=2

DESIG=4

DESIG=3

DESIG=5

 **$T_{c\bar{c}1}(4430)^+$** 

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

$G, C$  need confirmation.

was  $Z_c(4430)$ ,  $X(4430)^\pm$

Quantum numbers not established.

Mass  $m = 4478^{+15}_{-18}$  MeV

Full width  $\Gamma = 181 \pm 31$  MeV

NODE=M195

NODE=M195M;DTYPE=M

NODE=M195W;DTYPE=G

 **$T_{c\bar{c}1}(4430)^+$  DECAY MODES**

Fraction ( $\Gamma_i/\Gamma$ )

$p$  (MeV/c)

$\pi^+\psi(2S)$	seen	711
$\pi^+J/\psi$	seen	1162

NODE=M195215;DESIG=1

DESIG=2

 **$T_{b\bar{b}1}(10610)$** 

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

was  $Z_b(10610)$ ,  $X(10610)$

Mass  $m = 10607.2 \pm 2.0$  MeV

Mass  $m = 10609 \pm 6$  MeV

Full width  $\Gamma = 18.4 \pm 2.4$  MeV

NODE=M207

NODE=M207M;DTYPE=M

NODE=M207M0;DTYPE=M

NODE=M207W;DTYPE=G

<b><math>T_{b\bar{b}1}(10610)</math> DECAY MODES</b>	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)	
$\gamma(1S)\pi^+$	( 5.4 <sup>+1.9</sup> <sub>-1.5</sub> ) $\times 10^{-3}$	1077	NODE=M207215;DESIG=1
$\gamma(1S)\pi^0$	not seen	1077	DESIG=9
$\gamma(2S)\pi^+$	( 3.6 <sup>+1.1</sup> <sub>-0.8</sub> ) %	551	DESIG=2
$\gamma(2S)\pi^0$	seen	552	DESIG=10
$\gamma(3S)\pi^+$	( 2.1 <sup>+0.8</sup> <sub>-0.6</sub> ) %	207	DESIG=3
$\gamma(3S)\pi^0$	seen	210	DESIG=11
$h_b(1P)\pi^+$	( 3.5 <sup>+1.2</sup> <sub>-0.9</sub> ) %	671	DESIG=4
$h_b(2P)\pi^+$	( 4.7 <sup>+1.7</sup> <sub>-1.3</sub> ) %	313	DESIG=5
$B^+\bar{B}^0$	not seen	504	DESIG=8
$B^+\bar{B}^{*0} + B^{*+}\bar{B}^0$	(85.6 <sup>+2.1</sup> <sub>-2.9</sub> ) %	—	DESIG=6

 **$T_{b\bar{b}1}(10650)^+$** 

$I^G(J^PC) = 1^+(1^{+-})$   
*I, G, C need confirmation.*

was  $Z_b(10650)$ ,  $X(10650)^\pm$

Mass  $m = 10652.2 \pm 1.5$  MeV

Full width  $\Gamma = 11.5 \pm 2.2$  MeV

$T_{b\bar{b}1}(10650)^-$  decay modes are charge conjugates of the modes below.

NODE=M208

NODE=M208M;DTYPE=M

NODE=M208W;DTYPE=G

NODE=M208215;NODE=M208

<b><math>T_{b\bar{b}1}(10650)^+</math> DECAY MODES</b>	Fraction ( $\Gamma_i/\Gamma$ )	$p$ (MeV/c)	
$\gamma(1S)\pi^+$	( 1.7 <sup>+0.8</sup> <sub>-0.6</sub> ) $\times 10^{-3}$	1117	DESIG=1
$\gamma(2S)\pi^+$	( 1.4 <sup>+0.6</sup> <sub>-0.4</sub> ) %	595	DESIG=2
$\gamma(3S)\pi^+$	( 1.6 <sup>+0.7</sup> <sub>-0.5</sub> ) %	259	DESIG=3
$h_b(1P)\pi^+$	( 8.4 <sup>+2.9</sup> <sub>-2.4</sub> ) %	714	DESIG=4
$h_b(2P)\pi^+$	(15 $\pm 4$ ) %	360	DESIG=5
$B^+\bar{B}^0$	not seen	703	DESIG=8
$B^+\bar{B}^{*0} + B^{*+}\bar{B}^0$	not seen	—	DESIG=6
$B^{*+}\bar{B}^{*0}$	(74 $\pm 4$ ) %	120	DESIG=7