$T_{c\overline{c}}(4050)^+$

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

OMITTED FROM SUMMARY TABLE
was $X(4050)$

Properties incompatible with a $q\overline{q}$ structure (exotic state). See the review on non-$q\overline{q}$ states.

Observed by MIZUK 08 in the $\pi^+\chi_{c1}(1P)$ invariant mass distribution in $\overline{B}^0 \to K^-\pi^+\chi_{c1}(1P)$ decays. Not seen by LEES 12B in this same mode after accounting for $K\pi$ resonant mass and angular structure.

$T_{c\overline{c}}(4050)^+$ MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
$4051 \pm 14 ^{+20}_{-41}$	[1] MIZUK	08	BELL	$\overline{B}^0 \to K^-\pi^+\chi_{c1}(1P)$

[1] From a Dalitz plot analysis with two Breit-Wigner amplitudes.

$T_{c\overline{c}}(4050)^+$ WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
$82 ^{+21}_{-17} ^{+47}_{-22}$	[1] MIZUK	08	BELL	$\overline{B}^0 \to K^-\pi^+\chi_{c1}(1P)$

[1] From a Dalitz plot analysis with two Breit-Wigner amplitudes.

$T_{c\overline{c}}(4050)^+$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)
Γ_1	$\pi^+\chi_{c1}(1P)$	seen
Γ_2	$\pi^\pm\psi(3770)$	not seen
Γ_3	$\pi^\pm\chi_{c0}(1P)$	not seen
Γ_4	$\pi^\pm\chi_{c2}(1P)$	not seen

$T_{c\overline{c}}(4050)^+$ BRANCHING RATIOS

$\Gamma(\pi^+\chi_{c1}(1P))/\Gamma_{total}$ $\hspace{2cm}$ Γ_1/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
seen		[1] MIZUK	08	BELL	$\overline{B}^0 \to K^-\pi^+\chi_{c1}(1P)$

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

not seen	16	[2] ABLIKIM	21W	BES3	$e^+e^- \to \chi_{cJ}\pi^+\pi^+$
not seen		[3] LEES	12B	BABR	$B \to K\pi\chi_{c1}(1P)$

[1] With a product branching fraction measurement of B($\overline{B}^0 \to K^- T_{c\overline{c}}(4050)^+$) × B($T_{c\overline{c}}(4050)^+ \to \pi^+\chi_{c1}(1P)$) = $(3.0^{+1.5}_{-0.8}{}^{+3.7}_{-1.6}) \times 10^{-5}$.

[2] ABLIKIM 21W measurement is limited by statistics.

[3] With a product branching fraction limit of B($\overline{B}^0 \to T_{c\overline{c}}(4050)^+ K^-$) × B($T_{c\overline{c}}(4050)^+ \to \chi_{c1}\pi^+$) < 1.8×10^{-5} at 90% CL.

$\Gamma\left(\pi^{\pm}\chi_{c0}(1P)\right)/\Gamma_{\text{total}}$ $\qquad\qquad$ Γ_3/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
not seen	18	[1] ABLIKIM	21W	BES3	$e^+e^- \to \chi_{cJ}\pi^+\pi^+$

[1] ABLIKIM 21W measurement is limited by statistics.

$\Gamma\left(\pi^{\pm}\chi_{c2}(1P)\right)/\Gamma_{\text{total}}$ $\qquad\qquad$ Γ_4/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
not seen	14	[1] ABLIKIM	21W	BES3	$e^+e^- \to \chi_{cJ}\pi^+\pi^+$

[1] ABLIKIM 21W measurement is limited by statistics.

$\Gamma\left(\pi^{\pm}\psi(3770)\right)/\Gamma_{\text{total}}$ $\qquad\qquad$ Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
not seen	[1] ABLIKIM	19AR	BES3	$e^+e^- \to \pi^+\pi^- D\overline{D}$

[1] From a measurement of $\sigma(e^+e^- \to \pi^+\pi^- D\overline{D})$ between $\sqrt{s} = 4.08$ and 4.6 GeV.

$T_{c\bar{c}}(4050)^+$ REFERENCES

ABLIKIM	21W	PR D103 052010	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	19AR	PR D100 032005	M. Ablikim *et al.*	(BESIII Collab.)
LEES	12B	PR D85 052003	J.P. Lees *et al.*	(BABAR Collab.)
MIZUK	08	PR D78 072004	R. Mizuk *et al.*	(BELLE Collab.)