

NODE=M191

 $T_{c\bar{c}}(4050)^+$
 $I^G(JPC) = 1^-(?^+)$
I, G, C need confirmation.

OMMITTED FROM SUMMARY TABLE
was $X(4050)$

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

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

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
4051±14⁺²⁰₋₄₁	¹ MIZUK	08	BELL $\bar{B}^0 \rightarrow K^- \pi^+ \chi_{c1}(1P)$

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

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

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
82⁺²¹⁺⁴⁷₋₁₇₋₂₂	¹ MIZUK	08	BELL $\bar{B}^0 \rightarrow K^- \pi^+ \chi_{c1}(1P)$

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

NODE=M191M

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NODE=M191W

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NODE=M191215;NODE=M191

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

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 \pi^+ \chi_{c1}(1P)$	seen
$\Gamma_2 \pi^\pm \psi(3770)$	not seen
$\Gamma_3 \pi^\pm \chi_{c0}(1P)$	not seen
$\Gamma_4 \pi^\pm \chi_{c2}(1P)$	not seen

DESIG=1

DESIG=2

DESIG=3

DESIG=4

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_1/Γ
seen		¹ MIZUK	08	BELL $\bar{B}^0 \rightarrow K^- \pi^+ \chi_{c1}(1P)$	

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

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

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

² ABLIKIM 21W measurement is limited by statistics.

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

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NODE=M191R01;LINKAGE=LE

NODE=M191R02

NODE=M191R02

NODE=M191R02;LINKAGE=A

NODE=M191R03

NODE=M191R03

NODE=M191R03;LINKAGE=A

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_3/Γ
not seen	18	¹ ABLIKIM	21W BES3	$e^+ e^- \rightarrow \chi_{cJ} \pi^+ \pi^+$	

¹ ABLIKIM 21W measurement is limited by statistics.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_4/Γ
not seen	14	¹ ABLIKIM	21W BES3	$e^+ e^- \rightarrow \chi_{cJ} \pi^+ \pi^+$	

¹ ABLIKIM 21W measurement is limited by statistics.

$\Gamma(\pi^\pm \psi(3770))/\Gamma_{\text{total}}$	Γ_2/Γ		
VALUE	DOCUMENT ID	TECN	COMMENT
not seen	¹ ABLIKIM	19AR BES3	$e^+ e^- \rightarrow \pi^+ \pi^- D\bar{D}$
¹ From a measurement of $\sigma(e^+ e^- \rightarrow \pi^+ \pi^- D\bar{D})$ between $\sqrt{s} = 4.08$ and 4.6 GeV.			

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

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

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REFID=61221
REFID=59910
REFID=54042
REFID=52535