NODE=M223

# $T_{c\bar{c}}(4055)^+$

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

OMITTED FROM SUMMARY TABLE
was $X(4055)^{\pm}$

Properties incompatible with a $q\bar{q}$ structure (exotic state). See the review on non-$q\bar{q}$ states. NODE=M223

Needs confirmation. Seen by WANG 15A in the $\psi(2S)\pi^+$ invariant mass distribution in $\psi(4360) \to \psi(2S)\pi^+\pi^-$ decay.

## $T_{c\bar{c}}(4055)^+$ MASS

NODE=M223M

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **4054 ±3 ±1** | [1] WANG | 15A | BELL | 10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 4039.3±6.0 | [2] ABLIKIM | 18K | BES3 | $e^+e^- \to \pi^0\pi^0\psi(2S)$ |
| 4032.1±2.4 | [3] ABLIKIM | 17V | BES3 | $e^+e^- \to \pi^+\pi^-\psi(2S)$ |

NODE=M223M
NODE=M223M;LINKAGE=A
NODE=M223M;LINKAGE=C
OCCUR=2
NODE=M223M;LINKAGE=B

[1] Statistical significance of 3.5 $\sigma$.
[2] Statistical error only, with significance of 5.9 $\sigma$ (from a fit with a 19% CL). Identified as the same structure observed in ABLIKIM 17V in $e^+e^- \to \pi^+\pi^-\psi(2S)$ decays.
[3] Statistical error only, with significance of 9.2 $\sigma$. From an unbinned maximum likelihood fit of the $\pi^+\pi^-\psi(2S)$ Dalitz plot from data collected at $\sqrt{s} = 4.416$ GeV for a $J^C = 1^+$ state. The fit does not match the detailed structure of the data, having a C.L. of only 8%.

## $T_{c\bar{c}}(4055)^+$ WIDTH

NODE=M223W

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **45 ±11 ±6** | [1] WANG | 15A | BELL | 10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 31.9±14.8 | [2] ABLIKIM | 18K | BES3 | $e^+e^- \to \pi^0\pi^0\psi(2S)$ |
| 26.1± 5.3 | [3] ABLIKIM | 17V | BES3 | $e^+e^- \to \pi^+\pi^-\psi(2S)$ |

NODE=M223W
NODE=M223W;LINKAGE=A
NODE=M223W;LINKAGE=C
NODE=M223W;LINKAGE=B

[1] Statistical significance of 3.5 $\sigma$.
[2] Statistical error only, with significance of 5.9 $\sigma$ (from a fit with a 19% CL). Identified as the same structure observed in ABLIKIM 17V in $e^+e^- \to \pi^+\pi^-\psi(2S)$ decays.
[3] Statistical error only, with significance of 9.2 $\sigma$. From an unbinned maximum likelihood fit of the $\pi^+\pi^-\psi(2S)$ Dalitz plot from data collected at $\sqrt{s} = 4.416$ GeV for a $J^C = 1^+$ state. The fit does not match the detailed structure of the data, having a C.L. of only 8%.

## $T_{c\bar{c}}(4055)^+$ DECAY MODES

NODE=M223215;NODE=M223

| | Mode | Fraction ($\Gamma_i/\Gamma$) | |
|---|---|---|---|
| $\Gamma_1$ | $\pi^+\psi(2S)$ | seen | DESIG=1 |
| $\Gamma_2$ | $\pi^+\psi(3770)$ | not seen | DESIG=2 |

## $T_{c\bar{c}}(4055)^+$ BRANCHING RATIOS

NODE=M223225

### $\Gamma(\pi^+\psi(2S))/\Gamma_{total}$ $\Gamma_1/\Gamma$

NODE=M223R01

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **seen** | [1] WANG | 15A | BELL | 10.58 $e^+e^- \to \gamma\pi^+\pi^-\psi(2S)$ |

NODE=M223R01
NODE=M223R01;LINKAGE=A

[1] Statistical significance of 3.5 $\sigma$.

### $\Gamma(\pi^+\psi(3770))/\Gamma_{total}$ $\Gamma_2/\Gamma$

NODE=M223R00

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

NODE=M223R00
NODE=M223R00;LINKAGE=A

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

## $T_{c\bar{c}}(4055)^+$ REFERENCES

NODE=M223


| | | | | | |
|---|---|---|---|---|---|
| ABLIKIM | 19AR | PR D100 032005 | M. Ablikim *et al.* | (BESIII Collab.) | REFID=59910 |
| ABLIKIM | 18K | PR D97 052001 | M. Ablikim *et al.* | (BESIII Collab.) | REFID=58896 |
| ABLIKIM | 17V | PR D96 032004 | M. Ablikim *et al.* | (BESIII Collab.) | REFID=58029 |
| Also | | PR D99 019903 (errat.) | M. Ablikim *et al.* | (BESIII Collab.) | REFID=59611 |
| WANG | 15A | PR D91 112007 | X.L. Wang *et al.* | (BELLE Collab.) | REFID=56839 |