

# $T_{b\bar{s}}(5568)^+$

$$I(J^P) = 1(?^?)$$

OMITTED FROM SUMMARY TABLE  
was  $X(5568)^\pm$

Seen as a peak in the  $B_s\pi^\pm$  mass spectrum with a significance of more than  $3\sigma$  by ABAZOV 16E and ABAZOV 18A in inclusive  $p\bar{p}$  collisions at 1.96 TeV. Not seen by AAIJ 16AI, AABOUD 18L, AALTONEN 18A, and SIRUNYAN 18J. Needs confirmation.

## $T_{b\bar{s}}(5568)^+$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$5566.9^{+3.2+0.6}_{-3.1-1.2}$	278	<sup>1</sup> ABAZOV 18A	D0	$p\bar{p} \rightarrow B_s^0 \pi^\pm X$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$5567.8 \pm 2.9^{+0.9}_{-1.9}$	133	<sup>2</sup> ABAZOV 16E	D0	$p\bar{p} \rightarrow B_s^0 \pi^\pm X$
<sup>1</sup> From the combined analysis of $B_s^0 \rightarrow J/\psi\phi$ and $B_s^0 \rightarrow D_s^\pm \mu^\mp X$ decays. <sup>2</sup> Assumes $T_{b\bar{s}}(5568)^\pm \rightarrow B_s \pi^\pm$ decay. If $T_{b\bar{s}}(5568)^\pm \rightarrow B_s^* \pi^\pm$ decay is assumed, the mass shifts upward by 49 MeV.				

## $T_{b\bar{s}}(5568)^+$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
$18.6^{+7.9+3.5}_{-6.1-3.8}$	278	<sup>1</sup> ABAZOV 18A	D0	$p\bar{p} \rightarrow B_s \pi^\pm X$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$21.9 \pm 6.4^{+5.0}_{-2.5}$	133	ABAZOV 16E	D0	$p\bar{p} \rightarrow B_s \pi^\pm X$
<sup>1</sup> From the combined analysis of $B_s^0 \rightarrow J/\psi\phi$ and $B_s^0 \rightarrow D_s^\pm \mu^\mp X$ decays.				

## $T_{b\bar{s}}(5568)^+$ DECAY MODES

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad B_s \pi^\pm$	seen

## $T_{b\bar{s}}(5568)^+$ BRANCHING RATIOS

$\Gamma(B_s \pi^\pm)/\Gamma_{\text{total}}$	EVTS	DOCUMENT ID	TECN	COMMENT	$\Gamma_1/\Gamma$
seen	145	<sup>1</sup> ABAZOV 18A	D0	$p\bar{p} \rightarrow B_s^0 \pi^\pm X$	
seen	133	<sup>2</sup> ABAZOV 16E	D0	$p\bar{p} \rightarrow B_s^0 \pi^\pm X$	

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

not seen	<sup>3</sup> AABOUD	18L	ATLS	$pp \rightarrow B_S^0 \pi^\pm X$
not seen	<sup>4</sup> AALTONEN	18A	CDF	$p\bar{p} \rightarrow B_S^0 \pi^\pm X$
not seen	<sup>5</sup> SIRUNYAN	18J	CMS	$pp \rightarrow B_S^0 \pi^\pm X$
not seen	<sup>6</sup> AAIJ	16AI	LHCB	$pp \rightarrow B_S^0 \pi^\pm X$

<sup>1</sup> With  $B_S$  mesons reconstructed in decays to  $D_S^\pm \mu^\mp X$ .

<sup>2</sup> Seen in  $p\bar{p}$  collisions at 1.96 TeV at a rate of  $(8.6 \pm 1.9 \pm 1.4)\%$  relative to inclusive  $B_S$  production in the kinematic region  $10 < p_T(B_S) < 30$  GeV/c, with  $B_S$  mesons reconstructed in decays to  $J/\psi\phi$ . An alternative possibility,  $T_{b\bar{s}}(5568)^\pm \rightarrow B_S^* \pi^\pm$  with a missing  $\gamma$ , could not be ruled out.

<sup>3</sup> Not seen in  $24.4 \text{ fb}^{-1}$  of  $pp$  collision data at  $\sqrt{s} = 7$  and 8 TeV with  $B_S$  mesons reconstructed in decays to  $J/\psi\phi$ . An upper limit on the production rate times branching fraction for  $T_{b\bar{s}}(5568)^\pm \rightarrow B_S \pi^\pm$  relative to inclusive  $B_S$  production is less than 1.5% at  $p_T(B_S) > 10$  GeV/c and less than 1.6% at  $p_T(B_S) > 15$  GeV/c at 95% CL.

<sup>4</sup> Not seen in  $9.6 \text{ fb}^{-1}$  of  $p\bar{p}$  collision data at  $\sqrt{s} = 1.96$  TeV with  $B_S$  mesons reconstructed in decays to  $J/\psi\phi$ . An upper limit on the production rate times branching fraction for  $T_{b\bar{s}}(5568)^\pm \rightarrow B_S \pi^\pm$  relative to inclusive  $B_S$  production is less than 6.7% at 95% CL.

<sup>5</sup> Not seen in  $19.7 \text{ fb}^{-1}$  of  $pp$  collisions data at  $\sqrt{s} = 8$  TeV with  $B_S$  mesons reconstructed in decays to  $J/\psi\phi$ . An upper limit on the production rate times branching fraction for  $T_{b\bar{s}}(5568)^\pm \rightarrow B_S \pi^\pm$  relative to inclusive  $B_S$  production is less than 1.1% at  $p_T(B_S) > 10$  GeV/c and less than 1.0% at  $p_T(B_S) > 15$  GeV/c at 95% CL.

<sup>6</sup> Not seen in  $3 \text{ fb}^{-1}$  of  $pp$  collision data at  $\sqrt{s} = 7$  and 8 TeV in a scan over the  $T_{b\bar{s}}(5568)$  mass and width, with  $B_S$  mesons reconstructed in decays to  $D_S^- \pi^+$  or  $J/\psi\phi$ . An upper limit on the production rate times branching fraction for  $T_{b\bar{s}}(5568)^\pm \rightarrow B_S \pi^\pm$  relative to inclusive  $B_S$  production is less than 2.1% at  $p_T(B_S) > 10$  GeV/c at 90% CL.

### $T_{b\bar{s}}(5568)^+$ REFERENCES

AABOUD	18L	PRL 120 202007	M. Aaboud <i>et al.</i>	(ATLAS Collab.)
AALTONEN	18A	PRL 120 202006	T. Aaltonen <i>et al.</i>	(CDF Collab.)
ABAZOV	18A	PR D97 092004	V.M. Abazov <i>et al.</i>	(D0 Collab.)
SIRUNYAN	18J	PRL 120 202005	A.M. Sirunyan <i>et al.</i>	(CMS Collab.)
AAIJ	16AI	PRL 117 152003	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABAZOV	16E	PRL 117 022003	V.M. Abazov <i>et al.</i>	(D0 Collab.)