# $B^*_{s2}(5840)^0$

$I(J^P) = 0(2^+)$
$I$, $J$, $P$ need confirmation.

Quantum numbers shown are quark-model predictions.

## $B^*_{s2}(5840)^0$ MASS

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **5839.88±0.12 OUR FIT** | | | | |
| **5839.92±0.14 OUR AVERAGE** | | | | |
| 5839.86±0.09±0.17 | SIRUNYAN | 18DF | CMS | $pp$ at 8 TeV |
| 5839.99±0.05±0.20 | AAIJ | 13O | LHCB | $pp$ at 7 TeV |
| 5839.6 ±1.1 ±0.7 | [1] ABAZOV | 08E | D0 | $p\overline{p}$ at 1.96 TeV |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 5839.7 ±0.7 | [2] AALTONEN | 08K | CDF | Repl. by AALTONEN 14I |

[1] Observed in $B^{*0}_{s2} \to B^+ K^-$. Measured production rate of $B^{*0}_{s2}$ relative to $B^+$ to be $(1.15 \pm 0.23 \pm 0.13)\%$.

[2] Uses two-body decays into $K^-$ and $B^+$ mesons reconstructed as $B^+ \to J/\psi K^+$, $J/\psi \to \mu^+\mu^-$ or $B^+ \to \overline{D}^0\pi^+$, $\overline{D}^0 \to K^+\pi^-$.

## $m_{B^{*0}_{s2}} - m_{B^0_{s1}}$

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| 10.5±0.6 | [1] AALTONEN | 08K | CDF | Repl. by AALTONEN 14I |

[1] Uses two-body decays into $K^-$ and $B^+$ mesons reconstructed as $B^+ \to J/\psi K^+$, $J/\psi \to \mu^+\mu^-$ or $B^+ \to \overline{D}^0\pi^+$, $\overline{D}^0 \to K^+\pi^-$.

## $m_{B^{*0}_{s2}} - m_{B^+}$

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **560.48±0.12 OUR FIT** | | | | |
| **560.41±0.13±0.14** | [1] AALTONEN | 14I | CDF | $p\overline{p}$ at 1.96 TeV |

[1] AALTONEN 14I reports $m_{B_{s2}(5840)^0} - m_{B^+} - m_{K^-} = 66.73 \pm 0.13 \pm 0.14$ MeV which we adjusted by the $K^-$ mass.

## $B^*_{s2}(5840)^0$ WIDTH

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **1.49±0.27 OUR AVERAGE** | | | | |
| 1.52±0.34±0.30 | SIRUNYAN | 18DF | CMS | $pp$ at 8 TeV |
| 1.4 ±0.4 ±0.2 | AALTONEN | 14I | CDF | $p\overline{p}$ at 1.96 TeV |
| 1.56±0.13±0.47 | [1] AAIJ | 13O | LHCB | $pp$ at 7 TeV |

[1] Uses $B^*_{s2}(5840)^0 \to B^{*+} K^-$ decays.

## $B^*_{s2}(5840)^0$ DECAY MODES

Branching fractions are given relative to the one **DEFINED AS 1**.

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $B^+ K^-$ | **DEFINED AS 1** |
| $\Gamma_2$ | $B^{*+} K^-$ | $0.093 \pm 0.018$ |
| $\Gamma_3$ | $B^0 K^0_S$ | $0.43 \pm 0.11$ |
| $\Gamma_4$ | $B^{*0} K^0_S$ | $0.04 \pm 0.04$ |

## $B^*_{s2}(5840)^0$ BRANCHING RATIOS

### $\Gamma(B^+ K^-)/\Gamma_{\text{total}}$ $\Gamma_1/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **seen** | AALTONEN | 08K | CDF | $p\overline{p}$ at 1.96 TeV |
| **seen** | [1] ABAZOV | 08E | D0 | $p\overline{p}$ at 1.96 TeV |

[1] Measured production rate of $B^{*0}_{s2}$ relative to $B^+$ to be $(1.15 \pm 0.23 \pm 0.13)\%$.

### $\Gamma(B^{*+} K^-)/\Gamma(B^+ K^-)$ $\Gamma_2/\Gamma_1$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **$0.093 \pm 0.013 \pm 0.012$** | AAIJ | 13O | LHCB | $pp$ at 7 TeV |

### $\Gamma(B^{*0} K^0_S)/\Gamma(B^0 K^0_S)$ $\Gamma_4/\Gamma_3$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **$0.093 \pm 0.086 \pm 0.014$** | [1] SIRUNYAN | 18DF | CMS | $pp$ at 8 TeV |

[1] With the branching fraction $B(B^0 \to J/\psi K^{*0}) = (1.28 \pm 0.05) \times 10^{-3}$.

### $\Gamma(B^0 K^0_S)/\Gamma(B^+ K^-)$ $\Gamma_3/\Gamma_1$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **$0.432 \pm 0.077 \pm 0.078$** | [1] SIRUNYAN | 18DF | CMS | $pp$ at 8 TeV |

[1] With the branching fractions $B(B^+ \to J/\psi K^+) = (1.026 \pm 0.031) \times 10^{-3}$ and $B(B^0 \to J/\psi K^{*0}) = (1.28 \pm 0.05) \times 10^{-3}$.

### $\Gamma(B^{*+} K^-)/\Gamma(B^+ K^-)$ $\Gamma_2/\Gamma_1$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| **$0.081 \pm 0.021 \pm 0.015$** | [1] SIRUNYAN | 18DF | CMS | $pp$ at 8 TeV |

[1] With the branching fraction $B(B^+ \to J/\psi K^+) = (1.026 \pm 0.031) \times 10^{-3}$.

## $B^*_{s2}(5840)^0$ REFERENCES


| | | | | |
|---|---|---|---|---|
| SIRUNYAN | 18DF | EPJ C78 939 | A.M. Sirunyan *et al.* | (CMS Collab.) |
| AALTONEN | 14I | PR D90 012013 | T. Aaltonen *et al.* | (CDF Collab.) |
| AAIJ | 13O | PRL 110 151803 | R. Aaij *et al.* | (LHCb Collab.) |
| AALTONEN | 08K | PRL 100 082001 | T. Aaltonen *et al.* | (CDF Collab.) |
| ABAZOV | 08E | PRL 100 082002 | V.M. Abazov *et al.* | (D0 Collab.) |