BOTTOM, STRANGE MESONS
($B = \pm 1$, $S = \mp 1$)

$B_s^0 = s\overline{b}$, $\overline{B}_s^0 = \overline{s}b$,   similarly for B_s^*'s

B_s^0

$$I(J^P) = 0(0^-)$$

I, *J*, *P* need confirmation. Quantum numbers shown are quark-model predictions.

Mass $m_{B_s^0} = 5366.93 \pm 0.10$ MeV

$m_{B_s^0} - m_B = 87.37 \pm 0.12$ MeV

Mean life $\tau = (1.520 \pm 0.005) \times 10^{-12}$ s

$\quad c\tau = 455.7$ μm

$\Delta\Gamma_{B_s^0} = \Gamma_{B_{sL}^0} - \Gamma_{B_{sH}^0} = (0.083 \pm 0.005) \times 10^{12}$ s^{-1} (S = 1.8)

B_s^0-$\overline{B}_s^0$ mixing parameters

$\Delta m_{B_s^0} = m_{B_{sH}^0} - m_{B_{sL}^0} = (17.765 \pm 0.006) \times 10^{12}$ $\hbar$ s^{-1}

$\qquad\qquad\qquad\qquad = (1.1693 \pm 0.0004) \times 10^{-8}$ MeV

$x_s = \Delta m_{B_s^0}/\Gamma_{B_s^0} = 26.99 \pm 0.09$

χ_s (B_s^0-$\overline{B}_s^0$ mixing parameter) $= 0.499318 \pm 0.000005$

CP violation parameters in B_s^0

$\text{Re}(\epsilon_{B_s^0}) / (1 + |\epsilon_{B_s^0}|^2) = (-0.15 \pm 0.70) \times 10^{-3}$

$C_{KK}(B_s^0 \to K^+ K^-) = 0.162 \pm 0.035$

$S_{KK}(B_s^0 \to K^+ K^-) = 0.14 \pm 0.05$ (S = 1.3)

$r_B(B_s^0 \to D_s^\mp K^\pm) = 0.37^{+0.10}_{-0.09}$

$r_B(B_s^0 \to D_s^\mp K^\pm \pi^\pm \pi^\mp) = 0.47 \pm 0.08$

$\delta_B(B_s^0 \to D_s^\pm K^\mp) = (358 \pm 14)°$

$\delta_B(B_s^0 \to D_s^\pm K^\mp \pi^\pm \pi^\mp) = (-6^{+10}_{-13})°$

CP Violation phase β_s ($b \to c\overline{c}s$) $= (2.0 \pm 0.8) \times 10^{-2}$ rad

CP Violation phase β_s ($b \to s\overline{s}s$) $= (3.7 \pm 3.5) \times 10^{-2}$ rad

$|\lambda|$ ($B_s^0 \to J/\psi(1S)\phi$) $= 0.988 \pm 0.009$

$|\lambda|$ ($b \to c\overline{c}s$) $= 0.989 \pm 0.008$

A, *CP* violation parameter $= -0.79 \pm 0.08$

C, *CP* violation parameter $= 0.19 \pm 0.06$

S, *CP* violation parameter $= 0.17 \pm 0.06$

$A_{CP}^L(B_s \to J/\psi \overline{K}^*(892)^0) = -0.05 \pm 0.06$

$$A^{\parallel}_{CP}(B_s \to J/\psi\,\overline{K}^*(892)^0) = 0.17 \pm 0.15$$
$$A^{\perp}_{CP}(B_s \to J/\psi\,\overline{K}^*(892)^0) = -0.05 \pm 0.10$$
$$\boldsymbol{A_{CP}(B_s \to \pi^+ K^-) = 0.224 \pm 0.012}$$
$$A_{CP}(B^0_s \to [K^+ K^-]_D\,\overline{K}^*(892)^0) = -0.04 \pm 0.07$$
$$A_{CP}(B^0_s \to [\pi^+ K^-]_D\,K^*(892)^0) = -0.01 \pm 0.04$$
$$A_{CP}(B^0_s \to [\pi^+ \pi^-]_D\,K^*(892)^0) = 0.06 \pm 0.13$$
$$S(B^0_s \to \phi\gamma) = 0.43 \pm 0.32$$
$$C(B^0_s \to \phi\gamma) = 0.11 \pm 0.31$$
$$A^{\Delta}(B^0_s \to \phi\gamma) = -0.7 \pm 0.4$$
$$\Delta a_{\perp} < 1.2 \times 10^{-12} \text{ GeV, CL} = 95\%$$
$$\Delta a_{\parallel} = (-0.9 \pm 1.5) \times 10^{-14} \text{ GeV}$$
$$\Delta a_X = (1.0 \pm 2.2) \times 10^{-14} \text{ GeV}$$
$$\Delta a_Y = (-3.8 \pm 2.2) \times 10^{-14} \text{ GeV}$$
$$\mathrm{Re}(\xi) = -0.022 \pm 0.033$$
$$\mathrm{Im}(\xi) = 0.004 \pm 0.011$$

These branching fractions all scale with $B(\overline{b} \to B^0_s)$.

The branching fraction $B(B^0_s \to D^-_s \ell^+ \nu_\ell\,\text{anything})$ is not a pure measurement since the measured product branching fraction $B(\overline{b} \to B^0_s) \times B(B^0_s \to D^-_s \ell^+ \nu_\ell\,\text{anything})$ was used to determine $B(\overline{b} \to B^0_s)$, as described in the note on "B^0-$\overline{B}^0$ Mixing"

For inclusive branching fractions, *e.g.*, $B \to D^{\pm}\,\text{anything}$, the values usually are multiplicities, not branching fractions. They can be greater than one.

B^0_s DECAY MODES		Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
D^-_s anything		(62 $\pm$ 6) %		—
$D^{\pm}_s$ anything		(92 $\pm$ 11) %		—
$D^0 / \overline{D}^0$ anything		(38 $\pm$ 10) %		—
$\ell \nu_\ell X$		(9.6 $\pm$ 0.8) %		—
$e^+ \nu X^-$		(9.1 $\pm$ 0.8) %		—
$\mu^+ \nu X^-$		(10.2 $\pm$ 1.0) %		—
$D^-_s \ell^+ \nu_\ell\,\text{anything}$	[a]	(8.1 $\pm$ 1.3) %		—
$D^{*-}_s \ell^+ \nu_\ell\,\text{anything}$		(5.4 $\pm$ 1.1) %		—
$D^-_s \mu^+ \nu_\mu$		(2.31 $\pm$ 0.21) %		2321
$D^{*-}_s \mu^+ \nu_\mu$		(5.2 $\pm$ 0.5) %		2266
$D_{s1}(2536)^- \mu^+ \nu_\mu,\ D^-_{s1} \to$ $D^{*-} K^0_S$		(2.7 $\pm$ 0.7) $\times 10^{-3}$		—
$D_{s1}(2536)^- X \mu^+ \nu,\ D^-_{s1} \to$ $\overline{D}^0 K^+$		(4.4 $\pm$ 1.3) $\times 10^{-3}$		—
$D_{s2}(2573)^- X \mu^+ \nu,\ D^-_{s2} \to$ $\overline{D}^0 K^+$		(2.7 $\pm$ 1.0) $\times 10^{-3}$		—

$K^- \mu^+ \nu_\mu$	$(1.06 \pm 0.09) \times 10^{-4}$		2660
$D_s^- \pi^+$	$(2.98 \pm 0.14) \times 10^{-3}$		2320
$D_s^- \rho^+$	$(6.8 \pm 1.4) \times 10^{-3}$		2249
$D_s^- \pi^+ \pi^+ \pi^-$	$(6.1 \pm 1.0) \times 10^{-3}$		2301
$D_{s1}(2536)^- \pi^+$, $D_{s1}^- \to$ $D_s^- \pi^+ \pi^-$	$(2.4 \pm 0.8) \times 10^{-5}$		–
$D_s^\mp K^\pm$	$(2.25 \pm 0.12) \times 10^{-4}$		2293
$D_{s1}(2536)^\mp K^\pm$, $D_{s1}^- \to$ $\overline{D}^*(2007)^0 K^-$	$(2.48 \pm 0.28) \times 10^{-5}$		–
$D_s^- K^+ \pi^+ \pi^-$	$(3.2 \pm 0.6) \times 10^{-4}$		2249
$D_s^+ D_s^-$	$(4.4 \pm 0.5) \times 10^{-3}$		1824
$D_s^- D^+$	$(2.8 \pm 0.5) \times 10^{-4}$		1875
$D^+ D^-$	$(2.2 \pm 0.6) \times 10^{-4}$		1925
$D^{*+} D^{*-}$	$(2.14 \pm 0.32) \times 10^{-4}$		1778
$D^0 \overline{D}^0$	$(1.9 \pm 0.5) \times 10^{-4}$		1930
$D_s^{*-} \pi^+$	$(1.9 {}^{+\ 0.5}_{-\ 0.4}) \times 10^{-3}$		2265
$D_s^{*\mp} K^\pm$	$(1.32 {}^{+\ 0.40}_{-\ 0.32}) \times 10^{-4}$		–
$D_s^{*-} \rho^+$	$(9.5 \pm 2.0) \times 10^{-3}$		2191
$D_s^{*+} D_s^- + D_s^{*-} D_s^+$	$(1.39 \pm 0.17)\ \%$		1742
$D_s^{*+} D_s^{*-}$	$(1.44 \pm 0.21)\ \%$	S=1.1	1655
$D_s^{(*)+} D_s^{(*)-}$	$(4.5 \pm 1.4)\ \%$		–
$D^{*-} D_s^+$	$(3.9 \pm 0.8) \times 10^{-4}$		1801
$\overline{D}^{*0} \overline{K}^0$	$(2.8 \pm 1.1) \times 10^{-4}$		2278
$\overline{D}^0 \overline{K}^0$	$(4.3 \pm 0.9) \times 10^{-4}$		2330
$\overline{D}^0 K^- \pi^+$	$(1.04 \pm 0.13) \times 10^{-3}$		2312
$\overline{D}^*(2007)^0 K^- \pi^+$	$(7.3 \pm 2.6) \times 10^{-4}$		2259
$\overline{D}^0 \overline{K}^*(892)^0$	$(4.4 \pm 0.6) \times 10^{-4}$		2264
$\overline{D}^0 \overline{K}^*(1410)$	$(3.9 \pm 3.5) \times 10^{-4}$		2117
$\overline{D}^0 \overline{K}_0^*(1430)$	$(3.0 \pm 0.7) \times 10^{-4}$		2113
$\overline{D}^0 \overline{K}_2^*(1430)$	$(1.1 \pm 0.4) \times 10^{-4}$		2112
$\overline{D}^0 \overline{K}^*(1680)$	$<\ 7.8 \times 10^{-5}$	CL=90%	1997
$\overline{D}^0 \overline{K}_0^*(1950)$	$<\ 1.1 \times 10^{-4}$	CL=90%	1884
$\overline{D}^0 \overline{K}_3^*(1780)$	$<\ 2.6 \times 10^{-5}$	CL=90%	1970
$\overline{D}^0 \overline{K}_4^*(2045)$	$<\ 3.1 \times 10^{-5}$	CL=90%	1835
$\overline{D}^0 K^- \pi^+$ (non-resonant)	$(2.1 \pm 0.8) \times 10^{-4}$		2312
$D_{s2}^*(2573)^- \pi^+$, $D_{s2}^* \to$ $\overline{D}^0 K^-$	$(2.6 \pm 0.4) \times 10^{-4}$		–
$D_{s1}^*(2700)^- \pi^+$, $D_{s1}^* \to$ $\overline{D}^0 K^-$	$(1.6 \pm 0.8) \times 10^{-5}$		–
$D_{s1}^*(2860)^- \pi^+$, $D_{s1}^* \to$ $\overline{D}^0 K^-$	$(5 \pm 4) \times 10^{-5}$		–

$D_{s3}^*(2860)^- \pi^+$, $D_{s3}^* \to$ $\overline{D}^0 K^-$	$(2.2 \pm 0.6) \times 10^{-5}$			–
$\overline{D}^0 K^+ K^-$	$(5.6 \pm 0.9) \times 10^{-5}$			2243
$\overline{D}^0 f_0(980)$	$< 3.1 \times 10^{-6}$	CL=90%		2242
$\overline{D}^0 \phi$	$(2.30 \pm 0.25) \times 10^{-5}$			2235
$\overline{D}^{*0} \phi$	$(3.2 \pm 0.4) \times 10^{-5}$			2178
$D^{*\mp} \pi^{\pm}$	$< 6.1 \times 10^{-6}$	CL=90%		–
$\eta_c \phi$	$(5.0 \pm 0.9) \times 10^{-4}$			1663
$\eta_c \pi^+ \pi^-$	$(1.8 \pm 0.7) \times 10^{-4}$			1840
$J/\psi(1S)\phi$	$(1.04 \pm 0.04) \times 10^{-3}$			1588
$J/\psi(1S)\phi\phi$	$(1.20^{+ 0.14}_{- 0.16}) \times 10^{-5}$			764
$J/\psi(1S)\pi^0$	$< 1.2 \times 10^{-3}$	CL=90%		1787
$J/\psi(1S)\eta$	$(4.0 \pm 0.7) \times 10^{-4}$		S=1.4	1733
$J/\psi(1S)K_S^0$	$(1.92 \pm 0.14) \times 10^{-5}$			1743
$J/\psi(1S)\overline{K}^*(892)^0$	$(4.1 \pm 0.4) \times 10^{-5}$			1637
$J/\psi(1S)\eta'$	$(3.3 \pm 0.4) \times 10^{-4}$			1612
$J/\psi(1S)\pi^+ \pi^-$	$(2.02 \pm 0.17) \times 10^{-4}$		S=1.7	1775
$J/\psi(1S)f_0(500)$, $f_0 \to$ $\pi^+ \pi^-$	$< 4 \times 10^{-6}$	CL=90%		–
$J/\psi(1S)\rho$, $\rho \to \pi^+ \pi^-$	$< 3.4 \times 10^{-6}$	CL=90%		–
$J/\psi(1S)f_0(980)$, $f_0 \to$ $\pi^+ \pi^-$	$(1.24 \pm 0.15) \times 10^{-4}$		S=2.1	–
$J/\psi(1S)f_2(1270)$, $f_2 \to$ $\pi^+ \pi^-$	$(1.0 \pm 0.4) \times 10^{-6}$			–
$J/\psi(1S)f_2(1270)_0$, $f_2 \to$ $\pi^+ \pi^-$	$(7.3 \pm 1.7) \times 10^{-7}$			–
$J/\psi(1S)f_2(1270)_{\parallel}$, $f_2 \to$ $\pi^+ \pi^-$	$(1.05 \pm 0.33) \times 10^{-6}$			–
$J/\psi(1S)f_2(1270)_{\perp}$, $f_2 \to$ $\pi^+ \pi^-$	$(1.3 \pm 0.7) \times 10^{-6}$			–
$J/\psi(1S)f_0(1370)$, $f_0 \to$ $\pi^+ \pi^-$	$(4.4 ^{+ 0.6}_{- 4.0}) \times 10^{-5}$			–
$J/\psi(1S)f_0(1500)$, $f_0 \to$ $\pi^+ \pi^-$	$(2.04 ^{+ 0.32}_{- 0.24}) \times 10^{-5}$			–
$J/\psi(1S)f_2'(1525)_0$, $f_2' \to$ $\pi^+ \pi^-$	$(1.03 \pm 0.22) \times 10^{-6}$			–
$J/\psi(1S)f_2'(1525)_{\parallel}$, $f_2' \to$ $\pi^+ \pi^-$	$(1.2 ^{+ 2.6}_{- 0.8}) \times 10^{-7}$			–
$J/\psi(1S)f_2'(1525)_{\perp}$, $f_2' \to$ $\pi^+ \pi^-$	$(5 \pm 4) \times 10^{-7}$			–
$J/\psi(1S)f_0(1790)$, $f_0 \to$ $\pi^+ \pi^-$	$(4.9 ^{+10.0}_{- 1.0}) \times 10^{-6}$			–
$J/\psi(1S)\pi^+ \pi^-$ (nonresonant)	$(1.74 ^{+ 1.10}_{- 0.34}) \times 10^{-5}$			1775

$J/\psi(1S)\overline{K}^0\pi^+\pi^-$	$<\ 4.4$	$\times 10^{-5}$	CL=90%	1675
$J/\psi(1S)K^+K^-$	$(\ 7.9\ \pm\ 0.7\ )\times 10^{-4}$			1601
$J/\psi(1S)K^0K^-\pi^+ +$ c.c.	$(\ 9.5\ \pm\ 1.3\ )\times 10^{-4}$			1538
$J/\psi(1S)\overline{K}^0K^+K^-$	$<\ 1.2$	$\times 10^{-5}$	CL=90%	1333
$J/\psi K^*(892)^0\overline{K}^*(892)^0$	$(\ 1.10\pm\ 0.09)\times 10^{-4}$			1083
$J/\psi(1S)f'_2(1525)$	$(\ 2.6\ \pm\ 0.6\ )\times 10^{-4}$			1310
$J/\psi(1S)p\overline{p}$	$(\ 3.6\ \pm\ 0.4\ )\times 10^{-6}$			982
$J/\psi(1S)\gamma$	$<\ 7.3$	$\times 10^{-6}$	CL=90%	1790
$J/\psi\mu^+\mu^-,\ J/\psi\to\ \mu^+\mu^-$	$<\ 2.6$	$\times 10^{-9}$	CL=95%	–
$J/\psi(1S)\pi^+\pi^-\pi^+\pi^-$	$(\ 7.5\ \pm\ 0.8\ )\times 10^{-5}$			1731
$J/\psi(1S)f_1(1285)$	$(\ 7.2\ \pm\ 1.4\ )\times 10^{-5}$			1460
$\psi(2S)\eta$	$(\ 3.3\ \pm\ 0.9\ )\times 10^{-4}$			1338
$\psi(2S)\eta'$	$(\ 1.29\pm\ 0.35)\times 10^{-4}$			1158
$\psi(2S)\pi^+\pi^-$	$(\ 6.9\ \pm\ 1.2\ )\times 10^{-5}$			1397
$\psi(2S)\phi$	$(\ 5.3\ \pm\ 0.4\ )\times 10^{-4}$			1120
$\psi(2S)K^0$	$(\ 1.9\ \pm\ 0.5\ )\times 10^{-5}$			1352
$\psi(2S)K^-\pi^+$	$(\ 3.1\ \pm\ 0.4\ )\times 10^{-5}$			1310
$\psi(2S)\overline{K}^*(892)^0$	$(\ 3.3\ \pm\ 0.5\ )\times 10^{-5}$			1196
$\chi_{c1}\phi$	$(\ 1.97\pm\ 0.25)\times 10^{-4}$			1275
$\chi_{c1}(3872)\phi$	$(\ 1.22\pm\ 0.35)\times 10^{-4}$			936
$\chi_{c1}(3872)(K^+K^-)_{non-\phi}$	$(\ 9.4\ \pm\ 3.4\ )\times 10^{-5}$			961
$\chi_{c1}(3872)\pi^+\pi^-$	$(\ 4.6\ \pm\ 1.6\ )\times 10^{-5}$			1264
$\pi^+\pi^-$	$(\ 7.2\ \pm\ 1.0\ )\times 10^{-7}$			2680
$\pi^0\pi^0$	$<\ 7.7$	$\times 10^{-6}$	CL=90%	2680
$\eta\pi^0$	$<\ 1.0$	$\times 10^{-3}$	CL=90%	2654
$\eta\eta$	$<\ 1.43$	$\times 10^{-4}$	CL=90%	2627
$\rho^0\rho^0$	$<\ 3.20$	$\times 10^{-4}$	CL=90%	2569
$\eta'K^0_S$	$<\ 8.16$	$\times 10^{-6}$	CL=90%	2573
$\eta'\eta$	$<\ 6.5$	$\times 10^{-5}$	CL=90%	2568
$\eta'\eta'$	$(\ 3.3\ \pm\ 0.7\ )\times 10^{-5}$			2507
$\eta'\phi$	$<\ 8.2$	$\times 10^{-7}$	CL=90%	2495
$\phi f_0(980),\ f_0(980)\to\ \pi^+\pi^-$	$(\ 1.12\pm\ 0.21)\times 10^{-6}$			–
$\phi f_2(1270),\ f_2(1270)\to\ \pi^+\pi^-$	$(\ 6.1\ ^{+\ 1.8}_{-\ 1.5}\ )\times 10^{-7}$			–
$\phi\rho^0$	$(\ 2.7\ \pm\ 0.8\ )\times 10^{-7}$			2526
$\phi\pi^+\pi^-$	$(\ 3.5\ \pm\ 0.5\ )\times 10^{-6}$			2579
$\phi\phi$	$(\ 1.85\pm\ 0.14)\times 10^{-5}$			2482
$\phi\phi\phi$	$(\ 2.2\ \pm\ 0.6\ )\times 10^{-6}$			2165
π^+K^-	$(\ 5.9\ \pm\ 0.7\ )\times 10^{-6}$			2659
K^+K^-	$(\ 2.72\pm\ 0.23)\times 10^{-5}$			2638
$K^0\overline{K}^0$	$(\ 1.76\pm\ 0.31)\times 10^{-5}$			2637
$K^0\pi^+\pi^-$	$(\ 9.5\ \pm\ 2.1\ )\times 10^{-6}$			2653
$K^0K^\pm\pi^\mp$	$(\ 8.4\ \pm\ 0.9\ )\times 10^{-5}$			2622
$K^*(892)^-\pi^+$	$(\ 2.9\ \pm\ 1.1\ )\times 10^{-6}$			2607

$K^*(892)^\pm K^\mp$	$(1.9 \pm 0.5) \times 10^{-5}$		2585
$K_0^*(1430)^\pm K^\mp$	$(3.1 \pm 2.5) \times 10^{-5}$		–
$K_2^*(1430)^\pm K^\mp$	$(1.0 \pm 1.7) \times 10^{-5}$		–
$K^*(892)^0 \overline{K}{}^0 +$ c.c.	$(2.0 \pm 0.6) \times 10^{-5}$		2585
$K_0^*(1430)\overline{K}{}^0 +$ c.c.	$(3.3 \pm 1.0) \times 10^{-5}$		2468
$K_2^*(1430)^0 \overline{K}{}^0 +$ c.c.	$(1.7 \pm 2.2) \times 10^{-5}$		2467
$K_S^0 \overline{K}{}^*(892)^0 +$ c.c.	$(1.6 \pm 0.4) \times 10^{-5}$		2585
$K^0 K^+ K^-$	$(1.3 \pm 0.6) \times 10^{-6}$		2568
$\overline{K}{}^*(892)^0 \rho^0$	$< 7.67 \times 10^{-4}$	CL=90%	2550
$\overline{K}{}^*(892)^0 K^*(892)^0$	$(1.11 \pm 0.27) \times 10^{-5}$		2531
$\phi K^*(892)^0$	$(1.14 \pm 0.30) \times 10^{-6}$		2507
$p\overline{p}$	$< 4.4 \times 10^{-9}$	CL=90%	2514
$p\overline{p} K^+ K^-$	$(4.5 \pm 0.5) \times 10^{-6}$		2231
$p\overline{p} K^+ \pi^-$	$(1.39 \pm 0.26) \times 10^{-6}$		2355
$p\overline{p} \pi^+ \pi^-$	$(4.3 \pm 2.0) \times 10^{-7}$		2454
$p\overline{p} p\overline{p}$	$(2.3 \pm 1.0) \times 10^{-8}$		1797
$p\overline{\Lambda} K^- +$ c.c.	$(5.5 \pm 1.0) \times 10^{-6}$		2358
$\Lambda_c^- \Lambda \pi^+$	$(3.6 \pm 1.6) \times 10^{-4}$		1979
$\Lambda_c^- \Lambda_c^+$	$< 8.0 \times 10^{-5}$	CL=95%	1405

Lepton Family number (LF) violating modes or $\Delta B = 1$ weak neutral current (B1) modes

$\gamma\gamma$	B1		$< 3.1 \times 10^{-6}$	CL=90%	2683
$\phi\gamma$	B1		$(3.4 \pm 0.4) \times 10^{-5}$		2587
$\mu^+ \mu^-$	B1		$(3.34 \pm 0.27) \times 10^{-9}$		2681
$e^+ e^-$	B1		$< 9.4 \times 10^{-9}$	CL=90%	2683
$\tau^+ \tau^-$	B1		$< 6.8 \times 10^{-3}$	CL=95%	2011
$\mu^+ \mu^- \gamma$	B1		$< 2.0 \times 10^{-9}$		2681
$\mu^+ \mu^- \mu^+ \mu^-$	B1		$< 8.6 \times 10^{-10}$	CL=95%	2673
$S P,\ S \to \mu^+ \mu^-,$ $P \to \mu^+ \mu^-$	B1	[b]	$< 2.2 \times 10^{-9}$	CL=95%	–
$a a,\ a \to \mu^+ \mu^-$	B1		$< 5.8 \times 10^{-10}$	CL=95%	–
$\phi(1020)\mu^+ \mu^-$	B1		$(8.4 \pm 0.4) \times 10^{-7}$		2582
$f_2'(1525)\mu^+ \mu^-$	B1		$(1.62 \pm 0.22) \times 10^{-7}$		2464
$\overline{K}{}^*(892)^0 \mu^+ \mu^-$	B1		$(2.9 \pm 1.1) \times 10^{-8}$		2605
$\pi^+ \pi^- \mu^+ \mu^-$	B1		$(8.4 \pm 1.7) \times 10^{-8}$		2670
$\phi \nu \overline{\nu}$	B1		$< 5.4 \times 10^{-3}$	CL=90%	2587
$e^\pm \mu^\mp$	LF	[c]	$< 5.4 \times 10^{-9}$	CL=90%	2682
$e^\pm \tau^\mp$	LF		$< 1.4 \times 10^{-3}$	CL=90%	2389
$\mu^\pm \tau^\mp$	LF		$< 4.2 \times 10^{-5}$	CL=95%	2388
$\phi \mu^\pm e^\mp$	LF		$< 1.6 \times 10^{-8}$	CL=90%	2586
$p \mu^-$	L,B		$< 1.21 \times 10^{-8}$	CL=90%	2600

B_s^*

$$I(J^P) = 0(1^-)$$

I, J, P need confirmation. Quantum numbers shown are quark-model predictions.

Mass $m = 5415.4 \pm 1.4$ MeV   (S = 2.6)

$m_{B_s^*} - m_{B_s} = 48.5 \pm 1.4$ MeV   (S = 2.6)

B_s^* DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B_s \gamma$	seen	48

$B_{s1}(5830)^0$

$$I(J^P) = 0(1^+)$$
I, J, P need confirmation.

Mass $m = 5828.73 \pm 0.20$ MeV

$m_{B_{s1}^0} - m_{B^{*+}} = 503.98 \pm 0.17$ MeV

Full width $\Gamma = 0.5 \pm 0.4$ MeV

$B_{s1}(5830)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B^{*+} K^-$	seen	97

$B_{s2}^*(5840)^0$

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

Mass $m = 5839.88 \pm 0.12$ MeV

$m_{B_{s2}^{*0}} - m_{B^+} = 560.48 \pm 0.12$ MeV

Full width $\Gamma = 1.49 \pm 0.27$ MeV

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

$B_{s2}^*(5840)^0$ DECAY MODES	Fraction (Γ_i/Γ)	p (MeV/c)
$B^+ K^-$	**DEFINED AS 1**	252
$B^{*+} K^-$	0.093 ± 0.018	141
$B^0 K_S^0$	0.43 ± 0.11	245
$B^{*0} K_S^0$	0.04 ± 0.04	–

NOTES

[a] Not a pure measurement. See note at head of B_s^0 Decay Modes.

[b] Here S and P are the hypothetical scalar and pseudoscalar particles with masses of 2.5 GeV/c^2 and 214.3 MeV/c^2, respectively.

[c] The value is for the sum of the charge states or particle/antiparticle states indicated.