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 $\tau = (1.516 \pm 0.006) \times 10^{-12}$ s

$c\tau = 454.5$ μm

$\Delta\Gamma_{B_s^0} = \Gamma_{B_{sL}^0} - \Gamma_{B_{sH}^0} = (0.082 \pm 0.005) \times 10^{12}$ s^{-1}

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}

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

$x_s = \Delta m_{B_s^0}/\Gamma_{B_s^0} = 26.93 \pm 0.10$

χ_s (B_s^0-$\overline{B}_s^0$ mixing parameter) $= 0.499314 \pm 0.000005$

CP violation parameters in B_s^0

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

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

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

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

$\mathrm{r}_B(B_s^0 \to\ D_s^\mp K^\pm \pi^\pm \pi^\mp) = 0.47 \pm 0.08$

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

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

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 $= 0.17 \pm 0.06$

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

$A_{CP}^{\parallel}(B_s \to\ J/\psi \overline{K}^*(892)^0) = 0.17 \pm 0.15$
$A_{CP}^{\perp}(B_s \to\ J/\psi \overline{K}^*(892)^0) = -0.05 \pm 0.10$
$\boldsymbol{A_{CP}(B_s \to\ \pi^+ K^-)} = 0.224 \pm 0.012$
$A_{CP}(B_s^0 \to\ [K^+K^-]_D \overline{K}^*(892)^0) = 0.06 \pm 0.04$
$A_{CP}(B_s^0 \to\ [\pi^+K^-]_D K^*(892)^0) = -0.009 \pm 0.023$
$A_{CP}(B_s^0 \to\ [\pi^+\pi^-]_D K^*(892)^0) = 0.00 \pm 0.06$
$A_{CP}(B_s^0 \to\ [K^+\pi^-\pi^+\pi^-]_D \overline{K}^*(892)^0) = -0.029 \pm 0.024$
$A_{CP}(B_s^0 \to\ [\pi^+\pi^-\pi^+\pi^-]_D \overline{K}^*(892)^0) = 0.02 \pm 0.05$
$R_s^+ = \Gamma(B_s^0 \to\ [\pi^-K^+]_D \overline{K}^{*0}) / \Gamma(B_s^0 \to\ [\pi^+K^-]_D \overline{K}^{*0}) = 0.004 \pm 0.006$
$R_s^- = \Gamma(\overline{B}_s^0 \to\ [\pi^+K^-]_D K^{*0}) / \Gamma(\overline{B}_s^0 \to\ [\pi^-K^+]_D K^{*0}) = 0.004 \pm 0.006$
$R_s^+ = \Gamma(B_s^0 \to\ [\pi^-K^+\pi^+\pi^-]_D \overline{K}^{*0}) / \Gamma(B_s^0 \to\ [\pi^+K^-\pi^+\pi^-]_D \overline{K}^{*0}) = 0.019 \pm 0.008$
$R_s^- = \Gamma(\overline{B}_s^0 \to\ [\pi^+K^-\pi^+\pi^-]_D K^{*0}) / \Gamma(\overline{B}_s^0 \to\ [\pi^-K^+\pi^+\pi^-]_D K^{*0}) = 0.015 \pm 0.008$
$S(B_s^0 \to\ \phi\gamma) = 0.43 \pm 0.32$
$C(B_s^0 \to\ \phi\gamma) = 0.11 \pm 0.31$
$A^{\Delta}(B_s^0 \to\ \phi\gamma) = -0.7 \pm 0.4$
$\Delta a_\perp\ < 1.2 \times 10^{-12}$ GeV, CL = 95%
$\Delta a_\parallel = (-0.9 \pm 1.5) \times 10^{-14}$ GeV
$\Delta a_X = (1.0 \pm 2.2) \times 10^{-14}$ GeV
$\Delta a_Y = (-3.8 \pm 2.2) \times 10^{-14}$ GeV
$\mathrm{Re}(\xi) = -0.022 \pm 0.033$
$\mathrm{Im}(\xi) = 0.004 \pm 0.011$

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

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

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

$\boldsymbol{B_s^0}$ **DECAY MODES**	Fraction (Γ_i/Γ)	Scale factor/ Confidence level	p (MeV/c)
D_s^- anything	(62 ± 6) %		–
$D_s^{\pm}$ anything	(92 ±11) %		–
D^0 / $\overline{D}^0$ anything	(38 ±10) %		–
$\ell\nu_\ell X$	(9.6 ± 0.8) %		–
$e^+\nu X^-$	(9.1 ± 0.8) %		–
$\mu^+\nu X^-$	(10.2 ± 1.0) %		–

$D_s^- \ell^+ \nu_\ell$ anything	[a]	(8.1 ± 1.3) %		–
$D_s^{*-} \ell^+ \nu_\ell$ anything		(5.4 ± 1.1) %		–
$D_s^- \mu^+ \nu_\mu$		(2.29± 0.21) %		2321
$D_s^{*-} \mu^+ \nu_\mu$		(5.2 ± 0.5) %		2266
$D_{s1}(2536)^- \mu^+ \nu_\mu$, $D_{s1}^- \to D^{*-} K_S^0$		(2.7 ± 0.7) $\times 10^{-3}$		–
$D_{s1}(2536)^- X \mu^+ \nu$, $D_{s1}^- \to \overline{D}^0 K^+$		(4.4 ± 1.3) $\times 10^{-3}$		–
$D_{s2}(2573)^- X \mu^+ \nu$, $D_{s2}^- \to \overline{D}^0 K^+$		(2.7 ± 1.0) $\times 10^{-3}$		–
$K^- \mu^+ \nu_\mu$		(1.06± 0.09) $\times 10^{-4}$		2660
$D_s^- \pi^+$		(2.98± 0.14) $\times 10^{-3}$		2320
$D_s^- \rho^+$		(6.8 ± 1.4) $\times 10^{-3}$		2249
$D_s^- \pi^+ \pi^+ \pi^-$		(6.1 ± 1.0) $\times 10^{-3}$		2301
$D_{s1}(2536)^- \pi^+$, $D_{s1}^- \to D_s^- \pi^+ \pi^-$		(2.4 ± 0.8) $\times 10^{-5}$		–
$D_s^\mp K^\pm$		(2.25± 0.12) $\times 10^{-4}$		2293
$D_{s1}(2536)^\mp K^\pm$, $D_{s1}^- \to \overline{D}^*(2007)^0 K^-$		(2.48± 0.28) $\times 10^{-5}$		–
$D_s^- K^+ \pi^+ \pi^-$		(3.2 ± 0.6) $\times 10^{-4}$		2249
$D_s^+ D_s^-$		(4.5 ± 0.6) $\times 10^{-3}$	S=1.3	1824
$D_s^- D^+$		(3.1 ± 0.5) $\times 10^{-4}$		1875
$D^+ D^-$		(2.2 ± 0.6) $\times 10^{-4}$		1925
$D^{*+} D^{*-}$		(2.14± 0.32) $\times 10^{-4}$		1778
$D^0 \overline{D}^0$		(1.9 ± 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 ± 2.0) $\times 10^{-3}$		2191
$D_s^{*+} D_s^- + D_s^{*-} D_s^+$		(1.51± 0.13) %		1742
$D_s^{*+} D_s^{*-}$		(1.58± 0.20) %	S=1.3	1655
$D_s^{(*)+} D_s^{(*)-}$		(4.5 ± 1.4) %		–
$D^{*-} D_s^+$		(4.0 ± 0.7) $\times 10^{-4}$		1801
$\overline{D}^{*0} \overline{K}^0$		(2.8 ± 1.1) $\times 10^{-4}$		2278
$\overline{D}^0 \overline{K}^0$		(4.3 ± 0.9) $\times 10^{-4}$		2330
$\overline{D}^0 K^- \pi^+$		(1.04± 0.13) $\times 10^{-3}$		2312
$\overline{D}^*(2007)^0 K^- \pi^+$		(7.3 ± 2.6) $\times 10^{-4}$		2259
$\overline{D}^0 \overline{K}^*(892)^0$		(4.4 ± 0.6) $\times 10^{-4}$		2264
$\overline{D}^0 \overline{K}^*(1410)$		(3.9 ± 3.5) $\times 10^{-4}$		2117
$\overline{D}^0 \overline{K}_0^*(1430)$		(3.0 ± 0.7) $\times 10^{-4}$		2113
$\overline{D}^0 \overline{K}_2^*(1430)$		(1.1 ± 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 ± 0.8)	$\times 10^{-4}$		2312
$[K^+ K^-]_D \overline{K}^*(892)^0$	(4.4 ± 0.6)	$\times 10^{-4}$		–
$[\pi^+ \pi^-]_D \overline{K}^*(892)^0$	(4.4 ± 0.6)	$\times 10^{-4}$		–
$[\pi^+ \pi^- \pi^+ \pi^-]_D \overline{K}^*(892)^0$	(4.4 ± 0.6)	$\times 10^{-4}$		–
$D_{s2}^*(2573)^- \pi^+$, $D_{s2}^* \to \overline{D}^0 K^-$	(2.6 ± 0.4)	$\times 10^{-4}$		–
$D_{s1}^*(2700)^- \pi^+$, $D_{s1}^* \to \overline{D}^0 K^-$	(1.6 ± 0.8)	$\times 10^{-5}$		–
$D_{s1}^*(2860)^- \pi^+$, $D_{s1}^* \to \overline{D}^0 K^-$	(5 ± 4)	$\times 10^{-5}$		–
$D_{s3}^*(2860)^- \pi^+$, $D_{s3}^* \to \overline{D}^0 K^-$	(2.2 ± 0.6)	$\times 10^{-5}$		–
$\overline{D}^0 K^+ K^-$	(5.6 ± 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± 0.25)	$\times 10^{-5}$		2235
$\overline{D}^{*0} \phi$	(3.2 ± 0.4)	$\times 10^{-5}$		2178
$D^{*\mp} \pi^\pm$	$<$ 6.1	$\times 10^{-6}$	CL=90%	–
$\eta_c \phi$	(5.0 ± 0.9)	$\times 10^{-4}$		1663
$\eta_c \pi^+ \pi^-$	(1.8 ± 0.7)	$\times 10^{-4}$		1840
$J/\psi(1S) \phi$	(1.03± 0.04)	$\times 10^{-3}$		1588
$J/\psi(1S) \phi \phi$	($1.18^{+\ 0.14}_{-\ 0.16}$)	$\times 10^{-5}$		764
$J/\psi(1S) \pi^0$	$<$ 1.21	$\times 10^{-5}$	CL=90%	1787
$J/\psi(1S) \eta$	(4.0 ± 0.7)	$\times 10^{-4}$	S=1.4	1733
$J/\psi(1S) K_S^0$	(1.92± 0.14)	$\times 10^{-5}$		1743
$J/\psi(1S) \overline{K}^*(892)^0$	(4.1 ± 0.4)	$\times 10^{-5}$		1637
$J/\psi(1S) \eta'$	(3.3 ± 0.4)	$\times 10^{-4}$		1612
$J/\psi(1S) \pi^+ \pi^-$	(2.02± 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± 0.15)	$\times 10^{-4}$	S=2.1	–
$J/\psi(1S) f_2(1270)$, $f_2 \to \pi^+ \pi^-$	(1.0 ± 0.4)	$\times 10^{-6}$		–
$J/\psi(1S) f_2(1270)_0$, $f_2 \to \pi^+ \pi^-$	(7.3 ± 1.7)	$\times 10^{-7}$		–
$J/\psi(1S) f_2(1270)_\parallel$, $f_2 \to \pi^+ \pi^-$	(1.05± 0.33)	$\times 10^{-6}$		–
$J/\psi(1S) f_2(1270)_\perp$, $f_2 \to \pi^+ \pi^-$	(1.3 ± 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
$J/\psi(1S) K^0 K^-\pi^+ +$ c.c.	$(9.5 \pm 1.3) \times 10^{-4}$		1538
$J/\psi(1S)\overline{K}^0 K^+K^-$	$< 1.2 \times 10^{-5}$	CL=90%	1333
$J/\psi K^*(892)^0\overline{K}^*(892)^0$	$(1.08 \pm 0.09) \times 10^{-4}$		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
$J/\psi(1S)\overline{D}^0$	$< 1.0 \times 10^{-6}$	CL=90%	996
$\psi(2S)\eta$	$(3.3 \pm 0.9) \times 10^{-4}$		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
$\psi(2S)\phi$	$(5.2 \pm 0.4) \times 10^{-4}$		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
$\chi_{c1}\phi$	$(1.95 \pm 0.25) \times 10^{-4}$		1275
$\chi_{c1}(3872)\phi$	$(9.7 \pm 3.3) \times 10^{-5}$		936
$\chi_{c1}(3872)(K^+K^-)_{\ non-\phi}$	$(7.6 \pm 3.0) \times 10^{-5}$		961
$\chi_{c1}(3872)\pi^+\pi^-$	$(3.7 \pm 1.5) \times 10^{-5}$		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
$\phi\phi$	$(\ 1.84 \pm 0.14) \times 10^{-5}$			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
$K^0K^+K^-$	$(\ 1.3 \pm 0.6\ ) \times 10^{-6}$			2568
$\overline{K}^*(892)^0\rho^0$	$< 7.67 \times 10^{-4}$		CL=90%	2550
$\overline{K}^*(892)^0K^*(892)^0$	$(\ 1.11 \pm 0.27) \times 10^{-5}$			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 (*LF*), lepton (*L*), baryon (*B*) number 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
$f_2(1270)\gamma$	*B1*	$(\ 9\ ^{+\ 4}_{-\ 5}\ ) \times 10^{-6}$			2532
$f_2'(1525)\gamma$	*B1*	$(\ 6.6\ ^{+\ 0.9}_{-\ 0.8}\ ) \times 10^{-6}$			2469
$\phi(1680)\gamma,\ \phi \to K^+K^-$	*B1*	$(\ 9.2 \pm 2.4\ ) \times 10^{-7}$			–

$\phi_3(1850)\gamma,\ \phi_3 \to K^+K^-$	*B1*		$(\ 7\ {}^{+\ 6}_{-\ 5}\ ) \times 10^{-8}$		–
$f_2(2010)\gamma,\ f_2 \to K^+K^-$	*B1*		$(\ 1.0\ {}^{+\ 0.7}_{-\ 0.5}\ ) \times 10^{-7}$		–
$\mu^+\mu^-$	*B1*		$(\ 3.34 \pm\ 0.27) \times 10^{-9}$		2681
e^+e^-	*B1*	$<$	9.4×10^{-9}	CL=90%	2683
$\tau^+\tau^-$	*B1*	$<$	6.8×10^{-3}	CL=95%	2011
$\mu^+\mu^-\gamma$	*B1*	$<$	4.2×10^{-8}	CL=95%	2681
$\mu^+\mu^-\mu^+\mu^-$	*B1*	$<$	8.6×10^{-10}	CL=95%	2673
$SP,\ S \to \mu^+\mu^-,\ P \to \mu^+\mu^-$	*B1*	[*b*] $<$	2.2×10^{-9}	CL=95%	–
$aa,\ a \to \mu^+\mu^-$	*B1*	$<$	5.8×10^{-10}	CL=95%	–
$\phi(1020)\mu^+\mu^-$	*B1*		$(\ 8.3\ \pm\ 0.4\ ) \times 10^{-7}$		2582
$f_2'(1525)\mu^+\mu^-$	*B1*		$(\ 1.60 \pm\ 0.22) \times 10^{-7}$		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
$\overline{D}{}^0\mu^+\mu^-$	*B1*	$<$	1.2×10^{-7}	CL=90%	2354
$\phi\nu\overline{\nu}$	*B1*	$<$	5.4×10^{-3}	CL=90%	2587
$e^\pm\mu^\mp$	*LF*	[*c*] $<$	5.4×10^{-9}	CL=90%	2682
$e^\pm\tau^\mp$	*LF*	$<$	1.4×10^{-3}	CL=90%	2389
$\mu^\pm\tau^\mp$	*LF*	$<$	4.2×10^{-5}	CL=95%	2388
$\phi\mu^\pm e^\mp$	*LF*	$<$	1.6×10^{-8}	CL=90%	2586
$\phi\mu^\pm\tau^\mp$	*LF*	$<$	1.0×10^{-5}	CL=90%	2241
$p\mu^-$	*L,B*	$<$	1.21×10^{-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
$m_{B^{*0}_{s2}} - m_{B^+} = 560.48 \pm 0.12$ 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
$B^0K^0_S$	0.43 ± 0.11	245
$B^{*0}K^0_S$	0.04 ± 0.04	–

NOTES

[*a*] Not a pure measurement. See note at head of B^0_s 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.