B_s^0

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

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

B_s^0 MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
5366.93± 0.10 OUR FIT					
5366.91± 0.11 OUR AVERAGE					
5366.98± 0.07±0.13		[1] AAIJ	21C	LHCB	pp at 7, 8, 13 TeV
5366.85± 0.19±0.13		[2] AAIJ	19U	LHCB	pp at 7, 8, 13 TeV
5366.83± 0.25±0.27		[3] AAIJ	18AC	LHCB	pp at 7, 8, 13 TeV
5367.08± 0.38±0.15	128	[4] AAIJ	16U	LHCB	pp at 7, 8 TeV
5366.90± 0.28±0.23		[5] AAIJ	12E	LHCB	pp at 7 TeV
5364.4 ± 1.3 ±0.7		LOUVOT	09	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
5366.01± 0.73±0.33		[6] ACOSTA	06	CDF	$p\overline{p}$ at 1.96 TeV
5369.9 ± 2.3 ±1.3	32	[7] ABE	96B	CDF	$p\overline{p}$ at 1.8 TeV
5374 ±16 ±2	3	ABREU	94D	DLPH	$e^+e^- \rightarrow Z$
5359 ±19 ±7	1	[7] AKERS	94J	OPAL	$e^+e^- \rightarrow Z$
5368.6 ± 5.6 ±1.5	2	BUSKULIC	93G	ALEP	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5370 ± 1 ±3		DRUTSKOY	07A	BELL	Repl. by LOUVOT 09
5370 ±40	6	[8] AKERS	94J	OPAL	$e^+e^- \rightarrow Z$
5383.3 ± 4.5 ±5.0	14	ABE	93F	CDF	Repl. by ABE 96B

[1] Uses $B_s^0 \rightarrow J/\psi\pi^+\pi^-K^+K^-$ decays.
[2] Uses $B_s^0 \rightarrow J/\psi p\overline{p}$ decays.
[3] Uses $B_s \rightarrow \chi_{c1}K^+K^-$ mode.
[4] Uses $J/\psi \rightarrow \mu^+\mu^-$, $\phi \rightarrow K^+K^-$ decays, and observes 128 ± 13 events of $B_s^0 \rightarrow J/\psi\phi\phi$.
[5] Uses $B_s^0 \rightarrow J/\psi\phi$ fully reconstructed decays.
[6] Uses exclusively reconstructed final states containing a $J/\psi \rightarrow \mu^+\mu^-$ decays.
[7] From the decay $B_s \rightarrow J/\psi(1S)\phi$.
[8] From the decay $B_s \rightarrow D_s^-\pi^+$.

$m_{B_s^0} - m_B$

m_B is the average of our B masses $(m_{B^\pm}+m_{B^0})/2$.

VALUE (MeV)	CL%	DOCUMENT ID		TECN	COMMENT
87.37±0.12 OUR FIT					
87.42±0.24 OUR AVERAGE					
87.60±0.44±0.09		[1] AAIJ	15U	LHCB	pp at 7, 8 TeV
87.42±0.30±0.09		[2] AAIJ	12E	LHCB	pp at 7 TeV
86.64±0.80±0.08		[3] ACOSTA	06	CDF	$p\overline{p}$ at 1.96 TeV
• • • We use the following data for averages but not for fits. • • •					
89.7 ±2.7 ±1.2		ABE	96B	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
80 to 130	68	LEE-FRANZINI	90	CSB2	$e^+e^- \rightarrow \Upsilon(5S)$

[1] The reported result is $m_{B^0_s} - m_{B^0} = 87.45 \pm 0.44 \pm 0.09$ MeV. We convert it to the mass difference with respect to the average of $(m_{B^\pm} + m_{B^0})/2$. Uses the mode $B^0_s \to \psi(2S) K^- \pi^+$.

[2] The reported result is $m_{B^0_s} - m_{B^+} = 87.52 \pm 0.30 \pm 0.12$ MeV. We convert it to the mass difference with respect to the average of $(m_{B^\pm} + m_{B^0})/2$.

[3] The reported result is $m_{B^0_s} - m_{B^0} = 86.38 \pm 0.90 \pm 0.06$ MeV. We convert it to the mass difference with respect to the average of $(m_{B^\pm} + m_{B^0})/2$.

$m_{B^0_{sH}} - m_{B^0_{sL}}$

See the B^0_s-$\overline{B}^0_s$ MIXING section near the end of these B^0_s Listings.

B^0_s MEAN LIFE

The mean B^0_s lifetime is defined and computed as $1/\Gamma_{B^0_s}$, where $\Gamma_{B^0_s}$ is the average decay width of the B^0_s mass eigenstates.

VALUE (10^{-12} s)	EVTS	DOCUMENT ID	TECN	COMMENT
1.516±0.006 OUR EVALUATION		(Produced by HFLAV)		
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.518 \pm 0.041 \pm 0.027$		[1] AALTONEN 11AP	CDF	$p\overline{p}$ at 1.96 TeV
$1.398 \pm 0.044 {}^{+0.028}_{-0.025}$		[2] ABAZOV 06V	D0	$p\overline{p}$ at 1.96 TeV
$1.42 {}^{+0.14}_{-0.13} \pm 0.03$		[3] ABREU 00Y	DLPH	$e^+ e^- \to Z$
$1.53 {}^{+0.16}_{-0.15} \pm 0.07$		[4] ABREU,P 00G	DLPH	$e^+ e^- \to Z$
$1.36 \pm 0.09 {}^{+0.06}_{-0.05}$		[5] ABE 99D	CDF	$p\overline{p}$ at 1.8 TeV
$1.72 {}^{+0.20}_{-0.19} {}^{+0.18}_{-0.17}$		[6] ACKERSTAFF 98F	OPAL	$e^+ e^- \to Z$
$1.50 {}^{+0.16}_{-0.15} \pm 0.04$		[5] ACKERSTAFF 98G	OPAL	$e^+ e^- \to Z$
$1.47 \pm 0.14 \pm 0.08$		[4] BARATE 98C	ALEP	$e^+ e^- \to Z$
1.51 ± 0.11		[7] BARATE 98C	ALEP	$e^+ e^- \to Z$
$1.56 {}^{+0.29}_{-0.26} {}^{+0.08}_{-0.07}$		[5] ABREU 96F	DLPH	Repl. by ABREU 00Y
$1.65 {}^{+0.34}_{-0.31} \pm 0.12$		[4] ABREU 96F	DLPH	Repl. by ABREU 00Y
$1.76 \pm 0.20 {}^{+0.15}_{-0.10}$		[8] ABREU 96F	DLPH	Repl. by ABREU 00Y
$1.60 \pm 0.26 {}^{+0.13}_{-0.15}$		[9] ABREU 96F	DLPH	Repl. by ABREU,P 00G
1.67 ± 0.14		[10] ABREU 96F	DLPH	$e^+ e^- \to Z$
$1.61 {}^{+0.30}_{-0.29} {}^{+0.18}_{-0.16}$	90	[4] BUSKULIC 96E	ALEP	Repl. by BARATE 98C
$1.54 {}^{+0.14}_{-0.13} \pm 0.04$		[5] BUSKULIC 96M	ALEP	$e^+ e^- \to Z$
$1.42 {}^{+0.27}_{-0.23} \pm 0.11$	76	[5] ABE 95R	CDF	Repl. by ABE 99D

$1.74\ {}^{+1.08}_{-0.69}\ \pm0.07$		8	[11] ABE	95R	CDF	Sup. by ABE 96N
$1.54\ {}^{+0.25}_{-0.21}\ \pm0.06$		79	[5] AKERS	95G	OPAL	Repl. by ACKERSTAFF 98G
$1.59\ {}^{+0.17}_{-0.15}\ \pm0.03$		134	[5] BUSKULIC	95O	ALEP	Sup. by BUSKULIC 96M
$0.96\ \pm0.37$		41	[12] ABREU	94E	DLPH	Sup. by ABREU 96F
$1.92\ {}^{+0.45}_{-0.35}\ \pm0.04$		31	[5] BUSKULIC	94C	ALEP	Sup. by BUSKULIC 95O
$1.13\ {}^{+0.35}_{-0.26}\ \pm0.09$		22	[5] ACTON	93H	OPAL	Sup. by AKERS 95G

[1] AALTONEN 11AP combines the fully reconstrcuted $B_s^0 \to D_s^- \pi^+$ decays and partially reconstructed $B_s^0 \to D_s X$ decays.
[2] Measured using $D_s \mu^+$ vertices.
[3] Uses $D_s^- \ell^+$, and $\phi \ell^+$ vertices.
[4] Measured using D_s hadron vertices.
[5] Measured using $D_s^- \ell^+$ vertices.
[6] ACKERSTAFF 98F use fully reconstructed $D_s^- \to \phi\pi^-$ and $D_s^- \to K^{*0} K^-$ in the inclusive B_s^0 decay.
[7] Combined results from $D_s^- \ell^+$ and D_s hadron.
[8] Measured using $\phi\ell$ vertices.
[9] Measured using inclusive D_s vertices.
[10] Combined result for the four ABREU 96F methods.
[11] Exclusive reconstruction of $B_s \to \psi\phi$.
[12] ABREU 94E uses the flight-distance distribution of D_s vertices, ϕ-lepton vertices, and $D_s \mu$ vertices.

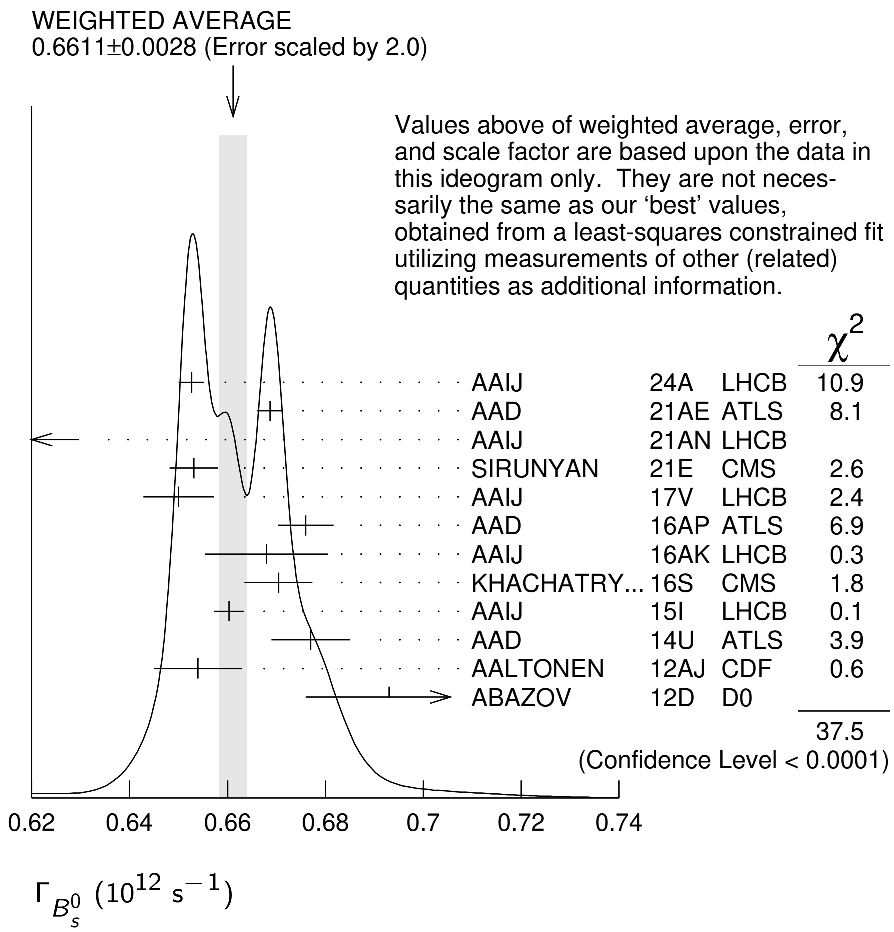
$\Gamma_{B_s^0}$

"OUR EVALUATION" includes the measurements of $\Gamma_{B_s^0}$ and $\Delta\Gamma_{B_s^0}$ listed in this section, as well as constraints from effective lifetimes with pure *CP* modes and flavor-specific modes.

VALUE (10^{12} s^{-1})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.6598±0.0025 OUR EVALUATION (Produced by HFLAV)				
0.6611±0.0028 OUR AVERAGE Error includes scale factor of 2.0. See the ideogram below.				
$0.6527\ {}^{+0.0013}_{-0.0015}\ \pm0.0022$	[1] AAIJ	24A	LHCB	pp at 13 TeV
$0.6687\pm0.0015\pm0.0022$	[2,3] AAD	21AE	ATLS	pp at 13 TeV
$0.608\ \pm0.018\ \pm0.012$	[4] AAIJ	21AN	LHCB	pp at 7, 8 TeV
$0.6531\pm0.0042\pm0.0026$	[3,5] SIRUNYAN	21E	CMS	pp at 13 TeV
$0.650\ \pm0.006\ \pm0.004$	[6] AAIJ	17V	LHCB	pp at 7, 8 TeV
$0.676\ \pm0.004\ \pm0.004$	[3,7] AAD	16AP	ATLS	pp at 8 TeV
$0.668\ \pm0.011\ \pm0.006$	[8] AAIJ	16AK	LHCB	pp at 7, 8 TeV
$0.6704\pm0.0043\pm0.0055$	[3] KHACHATRY...	16S	CMS	pp at 8 TeV
$0.6603\pm0.0027\pm0.0015$	[9] AAIJ	15I	LHCB	pp at 7, 8 TeV
$0.677\ \pm0.007\ \pm0.004$	[3] AAD	14U	ATLS	pp at 7 TeV
$0.654\ \pm0.008\ \pm0.004$	[3] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
$0.693\ {}^{+0.018}_{-0.017}$	[3] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV

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

0.6531 ± 0.0042 ± 0.0026	[3] SIRUNYAN	21E	CMS	pp at 13 TeV
0.6563 ± 0.0021	[3,10] AAIJ	19Q	LHCB	Repl. by AAIJ 24A
0.661 ± 0.004 ± 0.006	[11] AAIJ	13AR	LHCB	Repl. by AAIJ 15I
0.677 ± 0.007 ± 0.004	[3] AAD	12CV	ATLS	Repl. by AAD 14U
0.657 ± 0.009 ± 0.008	[3] AAIJ	12D	LHCB	Repl. by AAIJ 13AR
0.654 ± 0.011 ± 0.005	[3,12] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
0.672 ± 0.027 ± 0.013	[3] ABAZOV	09E	D0	Repl. by ABAZOV 08AM
0.658 ± 0.017 ± 0.009	[3,13] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
0.658 ± 0.022 ± 0.004	[3] ABAZOV	08AM	D0	Repl. by ABAZOV 12D
0.658 ± 0.035 $^{+0.0130}_{-0.004}$	[3,13] ABAZOV	07	D0	Repl. by ABAZOV 09E
0.714 $^{+0.007}_{-0.008}$ ± 0.010	[3,13] ACOSTA	05	CDF	Repl. by AALTONEN 08J



[1] Reports $\Gamma_s - \Gamma_d = -0.0056^{+0.0013}_{-0.0015} \pm 0.0014$ ps^{-1} using a time-dependent angular analysis of $B^0_s \to J/\psi K^+ K^-$ decays and the current B^0 lifetime of 1.517 ± 0.004 ps^{-1}.

[2] Reports a combination of $0.6703 \pm 0.0014 \pm 0.0018$ ps^{-1} with AAD 16AP.

[3] Measured using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[4] Measured using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays with $J/\psi \to e^+e^-$.

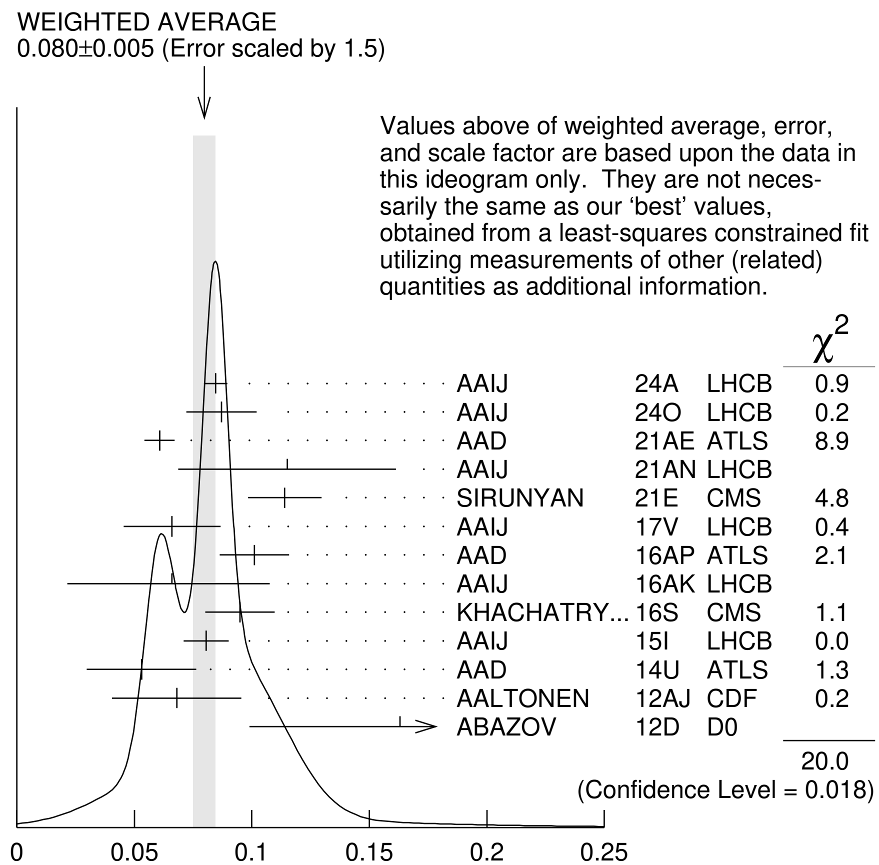
[5] Reports a combination of $0.6590 \pm 0.0032 \pm 0.0023$ ps^{-1} with KHACHATRYAN 16S.
[6] Measured using time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ in the region m$(K K) > 1.05$ GeV.
[7] Reports a combination of $0.675 \pm 0.003 \pm 0.003$ ps^{-1} with AAD 14U.
[8] Measured using a time-dependent angular analysis of $B_s^0 \to \psi(2S)\phi$ decays.
[9] Measured using a time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ decays.
[10] Reports $\Gamma_s - \Gamma_d = -0.0041 \pm 0.0024 \pm 0.0015$ ps^{-1} using a time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ decays and the B^0 lifetime of 1.520 ± 0.004 ps^{-1}. The results are further combined with those coming from $B_s^0 \to J/\psi \pi^+ \pi^-$, $B_s^0 \to \psi(2S)\phi$, and $B_s^0 \to D_s^+ D_s^-$.
[11] Measured using a combined time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ and $B_s^0 \to J/\psi \pi^+ \pi^-$ decays.
[12] Assuming CPV phase $\phi_s = -0.04$.
[13] Assuming CPV phase $\phi_s = 0$.

$\Delta\Gamma_{B_s^0}$

"OUR EVALUATION" includes the measurements of $\Gamma_{B_s^0}$ and $\Delta\Gamma_{B_s^0}$ listed in this section, as well as constraints from effective lifetimes with pure *CP* modes and flavor-specific modes.

VALUE (10^{12} s^{-1})	*DOCUMENT ID*		*TECN*	*COMMENT*
0.082 ±0.005 OUR EVALUATION (Produced by HFLAV)				
0.080 ±0.005 OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.				
$0.0845 \pm 0.0044 \pm 0.0024$	[1] AAIJ	24A	LHCB	pp at 13 TeV
$0.087 \pm 0.012 \pm 0.009$	[2] AAIJ	24O	LHCB	pp at 7, 8, 13 TeV
$0.0607 \pm 0.0047 \pm 0.0043$	[3,4] AAD	21AE	ATLS	pp at 13 TeV
$0.115 \pm 0.045 \pm 0.011$	[5] AAIJ	21AN	LHCB	pp at 7, 8 TeV
$0.114 \pm 0.014 \pm 0.007$	[3,6] SIRUNYAN	21E	CMS	pp at 13 TeV
$0.066 \pm 0.018 \pm 0.010$	[7] AAIJ	17V	LHCB	pp at 7, 8 TeV
$0.101 \pm 0.013 \pm 0.007$	[3,8] AAD	16AP	ATLS	pp at 8 TeV
$0.066 {}^{+0.041}_{-0.044} \pm 0.007$	[9] AAIJ	16AK	LHCB	pp at 7, 8 TeV
$0.095 \pm 0.013 \pm 0.007$	[3] KHACHATRY...	16S	CMS	pp at 8 TeV
$0.0805 \pm 0.0091 \pm 0.0032$	[1] AAIJ	15I	LHCB	pp at 7, 8 TeV
$0.053 \pm 0.021 \pm 0.010$	[3] AAD	14U	ATLS	pp at 7 TeV
$0.068 \pm 0.026 \pm 0.009$	[3] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
$0.163 {}^{+0.065}_{-0.064}$	[3,10] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.077 \pm 0.008 \pm 0.003$	[1] AAIJ	19Q	LHCB	Repl. by AAIJ 24A
$0.106 \pm 0.011 \pm 0.007$	[11] AAIJ	13AR	LHCB	Repl. by AAIJ 15I
$0.053 \pm 0.021 \pm 0.010$	[3] AAD	12CV	ATLS	Repl. by AAD 14U
$0.123 \pm 0.029 \pm 0.011$	[3] AAIJ	12D	LHCB	Repl. by AAIJ 13AR
$0.075 \pm 0.035 \pm 0.006$	[12] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
$0.085 {}^{+0.072}_{-0.078} \pm 0.001$	[13] ABAZOV	09E	D0	Repl. by ABAZOV 08AM

0.076 $^{+0.059}_{-0.063}$	± 0.006	[14] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
0.19 ± 0.07	$^{+0.02}_{-0.01}$	[3,15] ABAZOV	08AM	D0	Repl. by ABAZOV 12D
0.12 $^{+0.08}_{-0.10}$	± 0.02	[14,16] ABAZOV	07	D0	Repl. by ABAZOV 07N
0.13 ± 0.09		[17] ABAZOV	07N	D0	Repl. by ABAZOV 09E
0.47 $^{+0.19}_{-0.24}$	± 0.01	[14] ACOSTA	05	CDF	Repl. by AALTONEN 08J



$\Delta\Gamma_{B^0_s}$ (10^{12} s^{-1})

[1] Measured using time-dependent angular analysis of $B^0_s \rightarrow J/\psi K^+ K^-$ decays.

[2] Measured using CP eigenstates $B^0_s \rightarrow J/\psi \eta'$ and $B^0_s \rightarrow J/\psi \pi^+ \pi^-$ (selected to be predominantly CP-odd). Negligible CP violation and $\Gamma_{B^0_s} = 0.6628 \pm 0.0035$ ps^{-1} are assumed.

[3] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi \phi$ decays.

[4] Reports a combination of $0.0657 \pm 0.0043 \pm 0.0037$ ps^{-1} with AAD 16AP

[5] Measured using a time-dependent angular analysis of $B^0_s \rightarrow J/\psi \phi$ decays with $J/\psi \rightarrow e^+ e^-$.

[6] Reports a combination of $0.1032 \pm 0.0095 \pm 0.0048$ ps^{-1} with KHACHATRYAN 16S.

[7] Measured using time-dependent angular analysis of $B^0_s \rightarrow J/\psi K^+ K^-$ in the region $m(K K) > 1.05$ GeV.

[8] Reports a combination pf $0.066^{+0.041}_{-0.044} \pm 0.007$ ps^{-1} with AAD 14U.

[9] Measured using time-dependent angular analysis of $B_s^0 \to \psi(2S)\phi$ decays.

[10] The error includes both statistical and systematic uncertainties.

[11] AAIJ 13AR result comes from a combined fit to $B_s^0 \to J/\psi K^+ K^-$ and $B_s^0 \to J/\psi \pi^+ \pi^-$ data sets. Also reports $\Delta\Gamma_s = 0.100 \pm 0.016 \pm 0.003$ ps^{-1} from a fit to $B_s^0 \to J/\psi K^+ K^-$ decays.

[12] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays and assuming CP-violating angle $\beta_s(B^0 \to J/\psi \phi) = 0.02$.

[13] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B_d^0 \to J/\psi K^{*0}$ and $B_s^0 \to J/\psi \phi$.

[14] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays and assuming CP-violating phase $\phi_s = 0$.

[15] Obtaines 90% CL interval $-0.06 < \Delta\Gamma_s < 0.30$.

[16] ABAZOV 07 reports $0.17 \pm 0.09 \pm 0.02$ with CP-violating phase ϕ_s as a free parameter.

[17] Combines $D0$ measurements of time-dependent angular distributions in $B_s^0 \to J/\psi \phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution.

$\Delta\Gamma_{B_s^0}/\Gamma_{B_s^0}$

$\Gamma_{B_s^0}$ and $\Delta\Gamma_{B_s^0}$ are the decay rate average and difference between two B_s^0 CP eigenstates (light − heavy). "OUR EVALUATION" is derived from the averages of $\Gamma_{B_s^0}$ and $\Delta\Gamma_{B_s^0}$ (and their correlation).

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
0.124±0.007 OUR EVALUATION		(Produced by HFLAV)			
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.090 \pm 0.009 \pm 0.023$		[1] ESEN	13	BELL	$e^+e^- \to \Upsilon(5S)$
		[2] AAIJ	12D	LHCB	pp at 7 TeV
		[3] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
		[4] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
$0.147^{+0.036}_{-0.030}{}^{+0.042}_{-0.041}$		[1] ESEN	10	BELL	$e^+e^- \to \Upsilon(5S)$
$0.072 \pm 0.021 \pm 0.022$		[5] ABAZOV	09I	D0	$p\overline{p}$ at 1.96 TeV
>0.012	95	[5] AALTONEN	08F	CDF	$p\overline{p}$ at 1.96 TeV
$0.116^{+0.09}_{-0.10} \pm 0.010$		[6] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
$0.079^{+0.038}_{-0.035}{}^{+0.031}_{-0.030}$		[5] ABAZOV	07Y	D0	Repl. by ABAZOV 09I
$0.24^{+0.28}_{-0.38}{}^{+0.03}_{-0.04}$		[6,7] ABAZOV	05W	D0	Repl. by ABAZOV 08AM
$0.65^{+0.25}_{-0.33} \pm 0.01$		[6] ACOSTA	05	CDF	Repl. by AALTONEN 08J
<0.46	95	[8] ABREU	00Y	DLPH	$e^+e^- \to Z$
<0.69	95	[9] ABREU,P	00G	DLPH	$e^+e^- \to Z$
$0.25^{+0.21}_{-0.14}$		[10] BARATE	00K	ALEP	$e^+e^- \to Z$
<0.83	95	[11] ABE	99D	CDF	$p\overline{p}$ at 1.8 TeV
<0.67	95	[12] ACCIARRI	98S	L3	$e^+e^- \to Z$

[1] Assumes CP violation is negligible.

[2] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays.

[3] Uses the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays and assuming CP-violating angle $\beta_s(B^0 \to J/\psi\phi) = 0.02$.
[4] Measured using fully reconstructed $B_s \to J/\psi\phi$ decays.
[5] Assumes 2 B($B_s^0 \to D_s^{(*)} D_s^{(*)}$) $\simeq \Delta\Gamma_s^{CP} / \Gamma_s$.
[6] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.
[7] Uses $|A_0|^2 - |A_{||}|^2$=0.355 ± 0.066 from ACOSTA 05.
[8] Uses $D_s^- \ell^+$, and $\phi\ell^+$ vertices.
[9] Measured using D_s hadron vertices.
[10] Uses $\phi\phi$ correlations from $B_s^0 \to D_s^{(*)+} D_s^{(*)-}$.
[11] ABE 99D assumes $\tau_{B_s^0}$= 1.55 ± 0.05 ps.
[12] ACCIARRI 98S assumes $\tau_{B_s^0}$= 1.49 ± 0.06 ps and PDG 98 values of b production fraction.

B^0_{sH} MEAN LIFE

B^0_{sH} is the heavy mass state of two B_s^0 CP eigenstates.

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.616±0.009 OUR EVALUATION	(Produced by HFLAV)			
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.59 ±0.07 ±0.03	[1] HAYRAPETY...	24AX	CMS	pp at 13 TeV
0.99 $^{+0.42}_{-0.07}$ ±0.17	[2] AAD	23BY	ATLS	pp at 13 TeV
1.83 $^{+0.23}_{-0.20}$ ±0.04	[2] TUMASYAN	23A	CMS	pp at 13 TeV
2.07 ±0.29 ±0.03	[2] AAIJ	22	LHCB	pp at 7, 8, 13 TeV
1.70 $^{+0.60}_{-0.43}$ ±0.09	[2] SIRUNYAN	20AG	CMS	pp at 7, 8, 13 TeV
1.677±0.034±0.011	[3] SIRUNYAN	18BY	CMS	pp at 8 TeV
2.04 ±0.44 ±0.05	[2] AAIJ	17AI	LHCB	pp at 7, 8, 13 TeV
1.70 ±0.14 ±0.05	[4] ABAZOV	16C	D0	$p\overline{p}$ at 1.96 TeV
1.75 ±0.12 ±0.07	[1] AAIJ	13AB	LHCB	pp at 7 TeV
1.652±0.024±0.024	[5] AAIJ	13AR	LHCB	pp at 7 TeV
1.700±0.040±0.026	[6] AAIJ	12AN	LHCB	pp at 7 TeV
	[7] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
1.70 $^{+0.12}_{-0.11}$ ±0.03	[6] AALTONEN	11AB	CDF	$p\overline{p}$ at 1.96 TeV
1.613$^{+0.123}_{-0.113}$	[8,9] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
1.58 $^{+0.39}_{-0.42}$ $^{+0.01}_{-0.02}$	[9] ABAZOV	05W	D0	Repl. by ABAZOV 08AM
2.07 $^{+0.58}_{-0.46}$ ±0.03	[9] ACOSTA	05	CDF	Repl. by AALTONEN 08J

[1] Measured using a pure CP-odd final state $J/\psi K_S^0$ with the assumption that contributions from penguin diagrams are small.
[2] Measured using $B_s \to \mu^+\mu^-$ decays which, in the Standard Model, correspond to B^0_{sH} decays. Assumes -2 Re(λ)/(1 + $|\lambda|^2$) = 1.
[3] Measured using $B_s^0 \to J/\psi\pi^+\pi^-$ decays with 0.9240 < m($\pi\pi$) < 1.0204 GeV, which is dominated by the $f_0(980)$ resonance, making it a CP-odd state.

[4] Measured using $J/\psi\pi^+\pi^-$ mode with $0.880 < m(\pi\pi) < 1.080$ GeV/c^2, which is mostly $J/\psi f(0)(980)$ mode, a pure CP-odd final state.
[5] Measured using $B_s \rightarrow J/\psi\pi^+\pi^-$ decays which, in the limit of $\phi_s = 0$ and $|\lambda| = 1$, correspond to B^0_{sH} decays.
[6] Measured using a pure CP-odd final state $J/\psi f_0(980)$.
[7] Uses the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays assuming CP-violating angle $\beta_s(B^0 \rightarrow J/\psi\phi) = 0.02$.
[8] Obtained from $\Delta\Gamma_s$ and Γ_s fit with a correlation of 0.6.
[9] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays.

B^0_{sL} MEAN LIFE

B^0_{sL} is the light mass state of two B^0_s CP eigenstates.

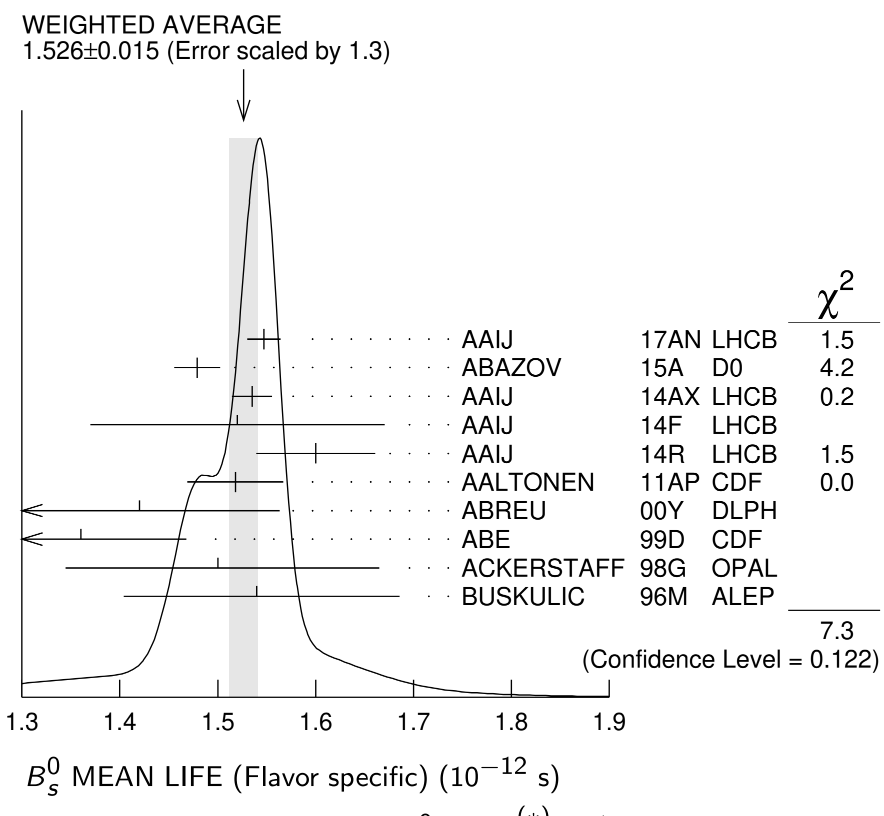
VALUE (10^{-12} s)	DOCUMENT ID	TECN	COMMENT
1.427±0.007 OUR EVALUATION	(Produced by HFLAV)		
1.452±0.016 OUR AVERAGE			
$1.445\pm0.016\pm0.008$	[1,2] AAIJ 23P	LHCB	pp at 7, 8, 13 TeV
$1.479\pm0.034\pm0.011$	[1] AAIJ 16AL	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$1.40\ \pm0.02$	[3] SIRUNYAN 18BY	CMS	pp at 8 TeV
$1.379\pm0.026\pm0.017$	[4] AAIJ 14F	LHCB	pp at 7, 8 TeV
$1.407\pm0.016\pm0.007$	[5] AAIJ 14R	LHCB	pp at 7 TeV
$1.440\pm0.096\pm0.009$	[5] AAIJ 12	LHCB	pp at 7 TeV
$1.455\pm0.046\pm0.006$	[5] AAIJ 12R	LHCB	Repl. by AAIJ 14R
	[6] AALTONEN 12D	CDF	$p\overline{p}$ at 1.96 TeV
$1.437^{+0.054}_{-0.047}$	[7,8] AALTONEN 08J	CDF	Repl. by AALTONEN 12D
$1.24\ ^{+0.14}_{-0.11}\ ^{+0.01}_{-0.02}$	[8] ABAZOV 05W	D0	Repl. by ABAZOV 08AM
$1.05\ ^{+0.16}_{-0.13}\ \pm0.02$	[8] ACOSTA 05	CDF	Repl. by AALTONEN 08J
$1.27\ \pm0.33\ \pm0.08$	[9] BARATE 00K	ALEP	$e^+e^- \rightarrow Z$

[1] Uses $B^0_s \rightarrow J/\psi\eta$ decays.
[2] AAIJ 23P reports a τ_L value combined with AAIJ 16AL result as $\tau_L = 1.452 \pm 0.014 \pm 0.007$ ps.
[3] Measured using results in SIRUNYAN 18BY for the heavy B^0_s lifetime obtained from $B^0_s \rightarrow J/\psi\pi^+\pi^-$ decays and the average effective $B^0_s \rightarrow J/\psi\phi$ lifetime, and magnitude squared of the CP-odd amplitude $|A_\perp|^2 = 0.250 \pm 0.006$. The uncertainty includes all statistical and systematic contributions.
[4] Measured using $B^0_s \rightarrow D^-_s D^+_s$. The effective lifetime is translated into a decay width of $\Gamma_L = 0.725 \pm 0.014 \pm 0.009$ ps^{-1}.
[5] Measured using $B^0_s \rightarrow K^+K^-$ decays. There may still be CPV in the decay.
[6] Uses the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays and assuming CP-violating angle $\beta_s(B^0 \rightarrow J/\psi\phi) = 0.02$.
[7] Obtained from $\Delta\Gamma_s$ and Γ_s fit with a correlation of 0.6.
[8] Measured using the time-dependent angular analysis of $B^0_s \rightarrow J/\psi\phi$ decays.

[9] Uses $\phi\phi$ correlations from $B_s^0 \to D_s^{(*)+} D_s^{(*)-}$.

B_s^0 MEAN LIFE (Flavor specific)

VALUE (10^{-12} s)	*DOCUMENT ID*		*TECN*	*COMMENT*
1.527±0.011 OUR EVALUATION				
1.526±0.015 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.			
1.547±0.013±0.011	[1] AAIJ	17AN	LHCB	pp at 7, 8 TeV
1.479±0.010±0.021	[2] ABAZOV	15A	D0	$p\overline{p}$ at 1.96 TeV
1.535±0.015±0.014	[3] AAIJ	14AX	LHCB	pp at 7 TeV
1.52 ±0.15 ±0.01	[4] AAIJ	14F	LHCB	pp at 7, 8 TeV
1.60 ±0.06 ±0.01	[5] AAIJ	14R	LHCB	pp at 7 TeV
1.518±0.041±0.027	[6] AALTONEN	11AP	CDF	$p\overline{p}$ at 1.96 TeV
$1.42\ ^{+0.14}_{-0.13}\ \pm0.03$	[7] ABREU	00Y	DLPH	$e^+e^- \to Z$
$1.36\ \pm0.09\ ^{+0.06}_{-0.05}$	[8] ABE	99D	CDF	$p\overline{p}$ at 1.8 TeV
$1.50\ ^{+0.16}_{-0.15}\ \pm0.04$	[8] ACKERSTAFF	98G	OPAL	$e^+e^- \to Z$
$1.54\ ^{+0.14}_{-0.13}\ \pm0.04$	[8] BUSKULIC	96M	ALEP	$e^+e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.398\pm0.044\ ^{+0.028}_{-0.025}$	[9] ABAZOV	06V	D0	Repl. by ABAZOV 15A



[1] AAIJ 17AN value was measured using $B_s^0 \to D_s^{(*)-} \mu^+ \nu_\mu$ decays relative to $B^0 \to D^{(*)-} \mu^+ \nu_\mu$ decays.

[2] Measured using $B_s^0 \to D_s^- \mu^+ \nu_\mu X$ decays.
[3] Measured using the $B_s^0 \to D_s^- \pi^+$ decays.
[4] Measured using $B_s^0 \to D^+ D_s^-$.
[5] Measured using $B_s^0 \to \pi^+ K^-$ decays.
[6] AALTONEN 11AP combines the fully reconstrcuted $B_s^0 \to D_s^- \pi^+$ decays and partially reconstructed $B_s^0 \to D_s X$ decays.
[7] Uses $D_s^- \ell^+$, and $\phi \ell^+$ vertices.
[8] Measured using $D_s^- \ell^+$ vertices.
[9] Measured using $D_s^- \mu^+$ vertices.

B_s^0 MEAN LIFE (partial)

B_s^0 mean life ($B_s \to D_s^+ D_s^-$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.379±0.031 OUR EVALUATION	(Produced by HFLAV)			
1.379±0.026±0.017	[1] AAIJ	14F	LHCB	pp at 7, 8 TeV

[1] Measured using $B_s^0 \to D_s^- D_s^+$. The effective lifetime is translated into a decay width of $\Gamma_L = 0.725 \pm 0.014 \pm 0.009$ ps^{-1}.

B_s^0 mean life ($B_s \to J/\psi \phi$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.480±0.007 OUR EVALUATION				
1.480±0.007 OUR AVERAGE				
1.481±0.007±0.005	[1] SIRUNYAN	18BY	CMS	pp at 8 TeV
1.480±0.011±0.005	[1] AAIJ	14E	LHCB	pp at 7 TeV
$1.444^{+0.098}_{-0.090}\pm0.020$	[1] ABAZOV	05B	D0	$p\overline{p}$ at 1.96 TeV
$1.34\ ^{+0.23}_{-0.19}\ \pm0.05$	[2] ABE	98B	CDF	$p\overline{p}$ at 1.8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.39\ ^{+0.13}_{-0.16}\ ^{+0.01}_{-0.02}$	[2] ABAZOV	05W	D0	$p\overline{p}$ at 1.96 TeV
$1.34\ ^{+0.23}_{-0.19}\ \pm0.05$	[3] ABE	96N	CDF	Repl. by ABE 98B

[1] Measured using fully reconstructed $B_s \to J/\psi \phi$ decays.
[2] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays.
[3] ABE 96N uses 58 ± 12 exclusive $B_s \to J/\psi \phi$ events.

B_s^0 mean life ($B_s \to J/\psi \eta$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.452±0.016 OUR EVALUATION	(Produced by HFLAV)			
1.452±0.016 OUR AVERAGE				
1.445±0.016±0.008	[1,2] AAIJ	23P	LHCB	pp at 7, 8, 13 TeV
1.479±0.034±0.011	[1] AAIJ	16L	LHCB	pp at 7, 8 TeV

[1] Uses $B_s^0 \to J/\psi \eta$ decays.
[2] AAIJ 23P reports a τ_L value combined with AAIJ 16AL result as $\tau_L = 1.452 \pm 0.014 \pm 0.007$ ps.

B^0_s mean life ($B_s \to J/\psi K^0_S$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.63±0.07 OUR EVALUATION	(Produced by HFLAV)			
1.63±0.07 OUR AVERAGE				
1.59±0.07±0.03	[1] HAYRAPETY...	24AX	CMS	pp at 13 TeV
1.75±0.12±0.07	[1] AAIJ	13AB	LHCB	pp at 7 TeV

[1] Measured using a pure CP-odd final state $J/\psi K^0_S$ with the assumption that contributions from penguin diagrams are small.

B^0_s mean life ($B_s \to J/\psi \pi^+\pi^-$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.646±0.013 OUR EVALUATION	(Produced by HFLAV)			
1.660±0.022 OUR AVERAGE				
1.632±0.013±0.05	[1] AAIJ	19AF	LHCB	pp at 13 TeV
1.677±0.034±0.011	[2] SIRUNYAN	18BY	CMS	pp at 8 TeV
1.70 ±0.14 ±0.05	[3] ABAZOV	16C	D0	$p\overline{p}$ at 1.96 TeV
1.652±0.024±0.024	[4] AAIJ	13AR	LHCB	pp at 7 TeV
$1.70\ ^{+0.12}_{-0.11}$ ±0.03	[5] AALTONEN	11AB	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.700±0.040±0.026	[5] AAIJ	12AN	LHCB	Repl. by AAIJ 13AR

[1] Based on $\Delta\Gamma = \Gamma_H - \Gamma_{B^0} = -0.05 \pm 0.004 \pm 0.004$ ps^{-1} and $\tau_{B^0} = 1.517 \pm 0.004$ ps. The first error is due to the combined $\Delta\Gamma$ uncertainty and the second is from τ_{B^0} uncertainty.

[2] Measured using $B^0_s \to J/\psi \pi^+\pi^-$ decays with $0.9240 < \mathrm{m}(\pi\pi) < 1.0204$ GeV, which is dominated by the $f_0(980)$ resonance, making it a CP-odd state.

[3] Measured using $J/\psi\pi^+\pi^-$ mode with $0.880 < m(\pi\pi) < 1.080$ GeV/c^2, which is mostly $J/\psi f(0)(980)$ mode, a pure CP-odd final state.

[4] Measured using $B_s \to J/\psi\pi^+\pi^-$ decays which, in the limit of $\phi_s = 0$ and $|\lambda| = 1$, correspond to B^0_{sH} decays.

[5] Measured using a pure CP-odd final state $J/\psi f_0(980)$.

B^0_s mean life ($B_s \to K^+K^-$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.408±0.017 OUR EVALUATION	(Produced by HFLAV)			
1.408±0.017 OUR AVERAGE				
1.407±0.016±0.007	[1] AAIJ	14R	LHCB	pp at 7 TeV
1.440±0.096±0.009	[1] AAIJ	12	LHCB	pp at 7 TeV

[1] Measured using $B^0_s \to K^+K^-$ decays. There may still be CPV in the decay.

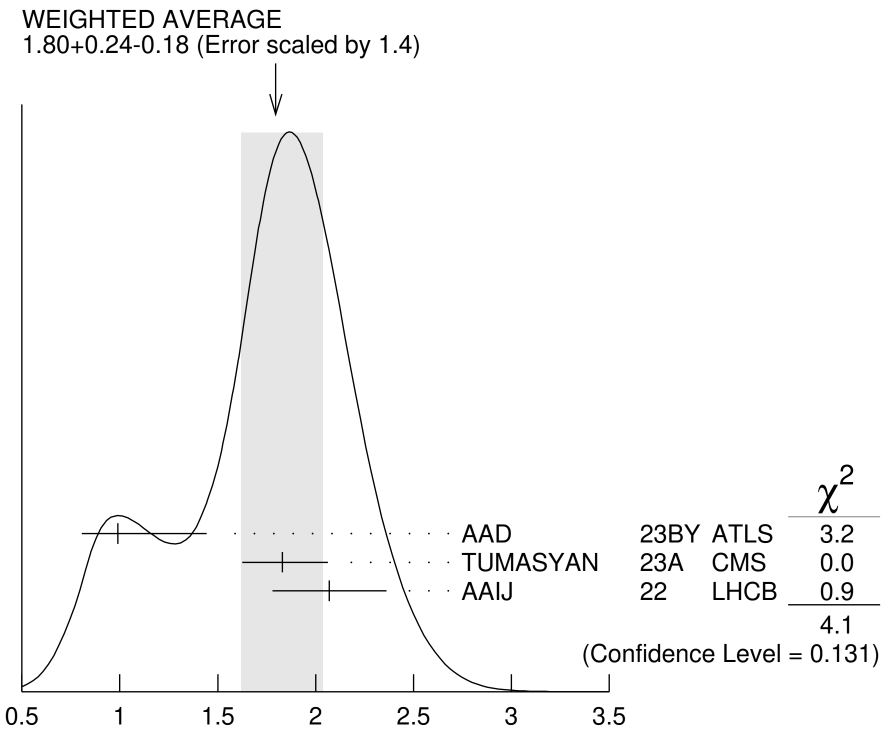
B^0_s mean life ($B_s \to \mu\mu$)

VALUE (10^{-12} s)	DOCUMENT ID		TECN	COMMENT
1.79±0.17 OUR EVALUATION	(Produced by HFLAV)			
$\mathbf{1.80^{+0.24}_{-0.18}}$ **OUR AVERAGE**	Error includes scale factor of 1.4. See the ideogram below.			
$0.99^{+0.42}_{-0.07}$±0.17	[1] AAD	23BY	ATLS	pp at 13 TeV
$1.83^{+0.23}_{-0.20}$±0.04	[1] TUMASYAN	23A	CMS	pp at 13 TeV
2.07±0.29±0.03	[1] AAIJ	22	LHCB	pp at 7, 8, 13 TeV

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

$1.70^{+0.60}_{-0.43}\pm0.09$	[1] SIRUNYAN	20AG	CMS	Repl. by TUMASYAN 23A
$2.04\pm0.44\pm0.05$	[1] AAIJ	17AI	LHCB	Repl. by AAIJ 22

[1] Measured using $B_s \to \mu^+\mu^-$ decays which, in the Standard Model, correspond to B^0_{sH} decays. Assumes $-2\ \mathrm{Re}(\lambda)/(1+|\lambda|^2) = 1$.



B^0_s mean life ($B_s \to \mu\mu$) (10^{-12} s)

B^0_{sL} mean life ($B_s \to J/\psi\eta$, $B_s \to D_s^+ D_s^-$)

VALUE (10^{-12} s)	*DOCUMENT ID*
1.437±0.014 OUR EVALUATION	(Produced by HFLAV)

B^0_{sH} mean life ($B_s \to J/\psi f_0$, $B_s \to J/\psi\pi\pi$)

VALUE (10^{-12} s)	*DOCUMENT ID*
1.646±0.013 OUR EVALUATION	(Produced by HFLAV)

$\tau_{B^0_s}/\tau_{B^0}$ mean life ratio

$\tau_{B^0_s}/\tau_{B^0}$ (direct measurements)

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
0.980±0.006±0.003	[1] SIRUNYAN	18BY	CMS	pp at 8 TeV

[1] Measured using $B^0_s \to J/\psi\,\phi(1020)$ and $B^0 \to J/\psi\,K^*(892)^0$ decays.

$\Gamma_{B^0_s} - \Gamma_{B^0}$

VALUE (10^{12} s^{-1})	*DOCUMENT ID*		*TECN*	*COMMENT*
−0.0041±0.0024±0.0015	[1] AAIJ	19Q	LHCB	pp at 13 TeV

[1] Measured using time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ decays.

$\Gamma_{B^0_{sH}} - \Gamma_{B^0}$

VALUE (10^{12} s^{-1})	DOCUMENT ID		TECN	COMMENT
−0.050±0.004±0.004	[1] AAIJ	19AF	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B_s^0 \to J/\psi \pi^+ \pi^-$ decays.

B_s^0 DECAY MODES

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

The branching fraction B($B_s^0 \to D_s^- \ell^+ \nu_\ell$ anything) is not a pure measurement since the measured product branching fraction B($\overline{b} \to B_s^0$) × B($B_s^0 \to D_s^- \ell^+ \nu_\ell$ 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.

	Mode		Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	D_s^- anything		(62 ± 6) %	
Γ_2	$D_s^\pm$ anything		(92 ±11) %	
Γ_3	$D^0 / \overline{D}^0$ anything		(38 ±10) %	
Γ_4	$\ell \nu_\ell X$		(9.6 ± 0.8) %	
Γ_5	$e^+ \nu X^-$		(9.1 ± 0.8) %	
Γ_6	$\mu^+ \nu X^-$		(10.2 ± 1.0) %	
Γ_7	$D_s^- \ell^+ \nu_\ell$ anything	[a]	(8.1 ± 1.3) %	
Γ_8	$D_s^{*-} \ell^+ \nu_\ell$ anything		(5.4 ± 1.1) %	
Γ_9	$D_s^- \mu^+ \nu_\mu$		(2.29± 0.21) %	
Γ_{10}	$D_s^{*-} \mu^+ \nu_\mu$		(5.2 ± 0.5) %	
Γ_{11}	$D_{s1}(2536)^- \mu^+ \nu_\mu$, $D_{s1}^- \to D^{*-} K_S^0$		(2.7 ± 0.7) × 10^{-3}	
Γ_{12}	$D_{s1}(2536)^- X \mu^+ \nu$, $D_{s1}^- \to \overline{D}^0 K^+$		(4.4 ± 1.3) × 10^{-3}	
Γ_{13}	$D_{s2}(2573)^- X \mu^+ \nu$, $D_{s2}^- \to \overline{D}^0 K^+$		(2.7 ± 1.0) × 10^{-3}	
Γ_{14}	$K^- \mu^+ \nu_\mu$		(1.06± 0.09) × 10^{-4}	
Γ_{15}	$D_s^- \pi^+$		(2.98± 0.14) × 10^{-3}	
Γ_{16}	$D_s^- \rho^+$		(6.8 ± 1.4) × 10^{-3}	
Γ_{17}	$D_s^- \pi^+ \pi^+ \pi^-$		(6.1 ± 1.0) × 10^{-3}	
Γ_{18}	$D_{s1}(2536)^- \pi^+$, $D_{s1}^- \to D_s^- \pi^+ \pi^-$		(2.4 ± 0.8) × 10^{-5}	

Γ_{19}	$D_s^{\mp} K^{\pm}$	$(2.25 \pm 0.12) \times 10^{-4}$	
Γ_{20}	$D_{s1}(2536)^{\mp} K^{\pm}$, $D_{s1}^{-} \to \overline{D}^{*}(2007)^0 K^{-}$	$(2.48 \pm 0.28) \times 10^{-5}$	
Γ_{21}	$D_s^{-} K^{+} \pi^{+} \pi^{-}$	$(3.2 \pm 0.6) \times 10^{-4}$	
Γ_{22}	$D_s^{+} D_s^{-}$	$(4.5 \pm 0.6) \times 10^{-3}$	S=1.3
Γ_{23}	$D_s^{-} D^{+}$	$(3.1 \pm 0.5) \times 10^{-4}$	
Γ_{24}	$D^{+} D^{-}$	$(2.2 \pm 0.6) \times 10^{-4}$	
Γ_{25}	$D^{*+} D^{-}$		
Γ_{26}	$D^{*-} D^{+}$		
Γ_{27}	$D^{*+} D^{*-}$	$(2.14 \pm 0.32) \times 10^{-4}$	
Γ_{28}	$D^0 \overline{D}^0$	$(1.9 \pm 0.5) \times 10^{-4}$	
Γ_{29}	$D_s^{*-} \pi^{+}$	$(1.9 {}^{+0.5}_{-0.4}) \times 10^{-3}$	
Γ_{30}	$D_s^{*\mp} K^{\pm}$	$(1.32 {}^{+0.40}_{-0.32}) \times 10^{-4}$	
Γ_{31}	$D_s^{*-} \rho^{+}$	$(9.5 \pm 2.0) \times 10^{-3}$	
Γ_{32}	$D_s^{*+} D_s^{-} + D_s^{*-} D_s^{+}$	(1.51 ± 0.13) %	
Γ_{33}	$D_s^{*+} D_s^{*-}$	(1.58 ± 0.20) %	S=1.3
Γ_{34}	$D_s^{(*)+} D_s^{(*)-}$	(4.5 ± 1.4) %	
Γ_{35}	$D^{*-} D_s^{+}$	$(4.0 \pm 0.7) \times 10^{-4}$	
Γ_{36}	$\overline{D}^{*0} \overline{K}^0$	$(2.8 \pm 1.1) \times 10^{-4}$	
Γ_{37}	$\overline{D}^0 \overline{K}^0$	$(4.3 \pm 0.9) \times 10^{-4}$	
Γ_{38}	$\overline{D}^0 K^{-} \pi^{+}$	$(1.04 \pm 0.13) \times 10^{-3}$	
Γ_{39}	$\overline{D}^{*}(2007)^0 K^{-} \pi^{+}$	$(7.3 \pm 2.6) \times 10^{-4}$	
Γ_{40}	$\overline{D}^0 \overline{K}^{*}(892)^0$	$(4.4 \pm 0.6) \times 10^{-4}$	
Γ_{41}	$\overline{D}^0 \overline{K}^{*}(1410)$	$(3.9 \pm 3.5) \times 10^{-4}$	
Γ_{42}	$\overline{D}^0 \overline{K}_0^{*}(1430)$	$(3.0 \pm 0.7) \times 10^{-4}$	
Γ_{43}	$\overline{D}^0 \overline{K}_2^{*}(1430)$	$(1.1 \pm 0.4) \times 10^{-4}$	
Γ_{44}	$\overline{D}^0 \overline{K}^{*}(1680)$	$< 7.8 \times 10^{-5}$	CL=90%
Γ_{45}	$\overline{D}^0 \overline{K}_0^{*}(1950)$	$< 1.1 \times 10^{-4}$	CL=90%
Γ_{46}	$\overline{D}^0 \overline{K}_3^{*}(1780)$	$< 2.6 \times 10^{-5}$	CL=90%
Γ_{47}	$\overline{D}^0 \overline{K}_4^{*}(2045)$	$< 3.1 \times 10^{-5}$	CL=90%
Γ_{48}	$\overline{D}^0 K^{-} \pi^{+}$(non-resonant)	$(2.1 \pm 0.8) \times 10^{-4}$	
Γ_{49}	$[K^{+} K^{-}]_D \overline{K}^{*}(892)^0$	$(4.4 \pm 0.6) \times 10^{-4}$	
Γ_{50}	$[\pi^{+} \pi^{-}]_D \overline{K}^{*}(892)^0$	$(4.4 \pm 0.6) \times 10^{-4}$	
Γ_{51}	$[\pi^{+} K^{-}]_D \overline{K}^{*}(892)^0$		
Γ_{52}	$[K^{+} \pi^{-}]_D \overline{K}^{*}(892)^0$		
Γ_{53}	$[\pi^{+} \pi^{-} \pi^{+} \pi^{-}]_D \overline{K}^{*}(892)^0$	$(4.4 \pm 0.6) \times 10^{-4}$	
Γ_{54}	$[\pi^{+} K^{-} \pi^{+} \pi^{-}]_D \overline{K}^{*}(892)^0$		
Γ_{55}	$[K^{+} \pi^{-} \pi^{+} \pi^{-}]_D \overline{K}^{*}(892)^0$		
Γ_{56}	$D_{s2}^{*}(2573)^{-} \pi^{+}$, $D_{s2}^{*} \to \overline{D}^0 K^{-}$	$(2.6 \pm 0.4) \times 10^{-4}$	

Γ_{57}	$D_{s1}^*(2700)^- \pi^+$, $D_{s1}^* \to \overline{D}^0 K^-$	$(1.6 \pm 0.8) \times 10^{-5}$	
Γ_{58}	$D_{s1}^*(2860)^- \pi^+$, $D_{s1}^* \to \overline{D}^0 K^-$	$(5 \pm 4) \times 10^{-5}$	
Γ_{59}	$D_{s3}^*(2860)^- \pi^+$, $D_{s3}^* \to \overline{D}^0 K^-$	$(2.2 \pm 0.6) \times 10^{-5}$	
Γ_{60}	$\overline{D}^0 K^+ K^-$	$(5.6 \pm 0.9) \times 10^{-5}$	
Γ_{61}	$\overline{D}^0 f_0(980)$	$< 3.1 \times 10^{-6}$	CL=90%
Γ_{62}	$\overline{D}^0 \phi$	$(2.30 \pm 0.25) \times 10^{-5}$	
Γ_{63}	$\overline{D}^{*0} \phi$	$(3.2 \pm 0.4) \times 10^{-5}$	
Γ_{64}	$D^{*\mp} \pi^\pm$	$< 6.1 \times 10^{-6}$	CL=90%
Γ_{65}	$\eta_c \phi$	$(5.0 \pm 0.9) \times 10^{-4}$	
Γ_{66}	$\eta' X_{s\overline{s}}$		
Γ_{67}	$\eta_c \pi^+ \pi^-$	$(1.8 \pm 0.7) \times 10^{-4}$	
Γ_{68}	$J/\psi(1S) \phi$	$(1.03 \pm 0.04) \times 10^{-3}$	
Γ_{69}	$J/\psi(1S) \phi \phi$	$(1.18 {}^{+0.14}_{-0.16}) \times 10^{-5}$	
Γ_{70}	$J/\psi(1S) \pi^0$	$< 1.21 \times 10^{-5}$	CL=90%
Γ_{71}	$J/\psi(1S) \eta$	$(4.0 \pm 0.7) \times 10^{-4}$	S=1.4
Γ_{72}	$J/\psi(1S) K_S^0$	$(1.92 \pm 0.14) \times 10^{-5}$	
Γ_{73}	$J/\psi(1S) \overline{K}^*(892)^0$	$(4.1 \pm 0.4) \times 10^{-5}$	
Γ_{74}	$J/\psi(1S) \eta'$	$(3.3 \pm 0.4) \times 10^{-4}$	
Γ_{75}	$J/\psi(1S) \pi^+ \pi^-$	$(2.02 \pm 0.17) \times 10^{-4}$	S=1.7
Γ_{76}	$J/\psi(1S) f_0(500)$, $f_0 \to \pi^+ \pi^-$	$< 4 \times 10^{-6}$	CL=90%
Γ_{77}	$J/\psi(1S) \rho$, $\rho \to \pi^+ \pi^-$	$< 3.4 \times 10^{-6}$	CL=90%
Γ_{78}	$J/\psi(1S) f_0(980)$, $f_0 \to \pi^+ \pi^-$	$(1.24 \pm 0.15) \times 10^{-4}$	S=2.1
Γ_{79}	$J/\psi(1S) f_2(1270)$, $f_2 \to \pi^+ \pi^-$	$(1.0 \pm 0.4) \times 10^{-6}$	
Γ_{80}	$J/\psi(1S) f_2(1270)_0$, $f_2 \to \pi^+ \pi^-$	$(7.3 \pm 1.7) \times 10^{-7}$	
Γ_{81}	$J/\psi(1S) f_2(1270)_\parallel$, $f_2 \to \pi^+ \pi^-$	$(1.05 \pm 0.33) \times 10^{-6}$	
Γ_{82}	$J/\psi(1S) f_2(1270)_\perp$, $f_2 \to \pi^+ \pi^-$	$(1.3 \pm 0.7) \times 10^{-6}$	
Γ_{83}	$J/\psi(1S) f_0(1370)$, $f_0 \to \pi^+ \pi^-$	$(4.4 {}^{+0.6}_{-4.0}) \times 10^{-5}$	
Γ_{84}	$J/\psi(1S) f_0(1500)$, $f_0 \to \pi^+ \pi^-$	$(2.04 {}^{+0.32}_{-0.24}) \times 10^{-5}$	
Γ_{85}	$J/\psi(1S) f'_2(1525)_0$, $f'_2 \to \pi^+ \pi^-$	$(1.03 \pm 0.22) \times 10^{-6}$	
Γ_{86}	$J/\psi(1S) f'_2(1525)_\parallel$, $f'_2 \to \pi^+ \pi^-$	$(1.2 {}^{+2.6}_{-0.8}) \times 10^{-7}$	

Γ_{87}	$J/\psi(1S) f_2'(1525)_{\perp}$, $f_2' \to \pi^+\pi^-$		$(5 \pm 4) \times 10^{-7}$	
Γ_{88}	$J/\psi(1S) f_0(1790)$, $f_0 \to \pi^+\pi^-$		$(4.9 {}^{+10.0}_{-1.0}) \times 10^{-6}$	
Γ_{89}	$J/\psi(1S)\pi^+\pi^-$ (nonresonant)		$(1.74 {}^{+1.10}_{-0.34}) \times 10^{-5}$	
Γ_{90}	$J/\psi(1S)\overline{K}^0\pi^+\pi^-$	$<$	4.4×10^{-5}	CL=90%
Γ_{91}	$J/\psi(1S) K^+ K^-$		$(7.9 \pm 0.7) \times 10^{-4}$	
Γ_{92}	$J/\psi(1S) K^0 K^- \pi^+ +$ c.c.		$(9.5 \pm 1.3) \times 10^{-4}$	
Γ_{93}	$J/\psi(1S)\overline{K}^0 K^+ K^-$	$<$	1.2×10^{-5}	CL=90%
Γ_{94}	$J/\psi K^*(892)^0 \overline{K}^*(892)^0$		$(1.08 \pm 0.09) \times 10^{-4}$	
Γ_{95}	$J/\psi(1S) f_2'(1525)$		$(2.6 \pm 0.6) \times 10^{-4}$	
Γ_{96}	$J/\psi(1S) p\overline{p}$		$(3.6 \pm 0.4) \times 10^{-6}$	
Γ_{97}	$J/\psi(1S)\gamma$	$<$	7.3×10^{-6}	CL=90%
Γ_{98}	$J/\psi\mu^+\mu^-$, $J/\psi \to \mu^+\mu^-$	$<$	2.6×10^{-9}	CL=95%
Γ_{99}	$J/\psi(1S)\pi^+\pi^-\pi^+\pi^-$		$(7.5 \pm 0.8) \times 10^{-5}$	
Γ_{100}	$J/\psi(1S) f_1(1285)$		$(7.2 \pm 1.4) \times 10^{-5}$	
Γ_{101}	$J/\psi(1S)\overline{D}^0$	$<$	1.0×10^{-6}	CL=90%
Γ_{102}	$\psi(2S)\eta$		$(3.3 \pm 0.9) \times 10^{-4}$	
Γ_{103}	$\psi(2S)\eta'$		$(1.29 \pm 0.35) \times 10^{-4}$	
Γ_{104}	$\psi(2S)\pi^+\pi^-$		$(6.9 \pm 1.2) \times 10^{-5}$	
Γ_{105}	$\psi(2S)\phi$		$(5.2 \pm 0.4) \times 10^{-4}$	
Γ_{106}	$\psi(2S) K^0$		$(1.9 \pm 0.5) \times 10^{-5}$	
Γ_{107}	$\psi(2S) K^-\pi^+$		$(3.1 \pm 0.4) \times 10^{-5}$	
Γ_{108}	$\psi(2S)\overline{K}^*(892)^0$		$(3.3 \pm 0.5) \times 10^{-5}$	
Γ_{109}	$\chi_{c1}\phi$		$(1.95 \pm 0.25) \times 10^{-4}$	
Γ_{110}	$\chi_{c1} K^+ K^-$			
Γ_{111}	$\chi_{c2} K^+ K^-$			
Γ_{112}	$\chi_{c1}(3872)\phi$		$(9.7 \pm 3.3) \times 10^{-5}$	
Γ_{113}	$\chi_{c1}(3872)(K^+K^-)_{non-\phi}$		$(7.6 \pm 3.0) \times 10^{-5}$	
Γ_{114}	$\chi_{c1}(3872)\pi^+\pi^-$		$(3.7 \pm 1.5) \times 10^{-5}$	
Γ_{115}	$\pi^+\pi^-$		$(7.2 \pm 1.0) \times 10^{-7}$	
Γ_{116}	$\pi^0\pi^0$	$<$	7.7×10^{-6}	CL=90%
Γ_{117}	$\eta\pi^0$	$<$	1.0×10^{-3}	CL=90%
Γ_{118}	$\eta\eta$	$<$	1.43×10^{-4}	CL=90%
Γ_{119}	$\rho^0\rho^0$	$<$	3.20×10^{-4}	CL=90%
Γ_{120}	$\eta' K^0_S$	$<$	8.16×10^{-6}	CL=90%
Γ_{121}	$\eta'\eta$	$<$	6.5×10^{-5}	CL=90%
Γ_{122}	$\eta'\eta'$		$(3.3 \pm 0.7) \times 10^{-5}$	
Γ_{123}	$\eta'\phi$	$<$	8.2×10^{-7}	CL=90%
Γ_{124}	$\phi f_0(980)$, $f_0(980) \to \pi^+\pi^-$		$(1.12 \pm 0.21) \times 10^{-6}$	
Γ_{125}	$\phi f_2(1270)$, $f_2(1270) \to \pi^+\pi^-$		$(6.1 {}^{+1.8}_{-1.5}) \times 10^{-7}$	
Γ_{126}	$\phi\rho^0$		$(2.7 \pm 0.8) \times 10^{-7}$	

Γ_{127}	$\phi\pi^+\pi^-$		$(3.5 \pm 0.5) \times 10^{-6}$	
Γ_{128}	$\phi\phi$		$(1.84 \pm 0.14) \times 10^{-5}$	
Γ_{129}	$\phi\phi\phi$		$(2.2 \pm 0.6) \times 10^{-6}$	
Γ_{130}	$\pi^+ K^-$		$(5.9 \pm 0.7) \times 10^{-6}$	
Γ_{131}	$K^+ K^-$		$(2.72 \pm 0.23) \times 10^{-5}$	
Γ_{132}	$K^0 \overline{K}^0$		$(1.76 \pm 0.31) \times 10^{-5}$	
Γ_{133}	$K^0 \pi^+\pi^-$		$(9.5 \pm 2.1) \times 10^{-6}$	
Γ_{134}	$K^0 K^\pm \pi^\mp$		$(8.4 \pm 0.9) \times 10^{-5}$	
Γ_{135}	$K^*(892)^- \pi^+$		$(2.9 \pm 1.1) \times 10^{-6}$	
Γ_{136}	$K^*(892)^\pm K^\mp$		$(1.9 \pm 0.5) \times 10^{-5}$	
Γ_{137}	$K_0^*(1430)^\pm K^\mp$		$(3.1 \pm 2.5) \times 10^{-5}$	
Γ_{138}	$K_2^*(1430)^\pm K^\mp$		$(1.0 \pm 1.7) \times 10^{-5}$	
Γ_{139}	$K^*(892)^0 \overline{K}^0 +$ c.c.		$(2.0 \pm 0.6) \times 10^{-5}$	
Γ_{140}	$K_0^*(1430) \overline{K}^0 +$ c.c.		$(3.3 \pm 1.0) \times 10^{-5}$	
Γ_{141}	$K_2^*(1430)^0 \overline{K}^0 +$ c.c.		$(1.7 \pm 2.2) \times 10^{-5}$	
Γ_{142}	$K_S^0 \overline{K}^*(892)^0 +$ c.c.		$(1.6 \pm 0.4) \times 10^{-5}$	
Γ_{143}	$K^0 K^+ K^-$		$(1.3 \pm 0.6) \times 10^{-6}$	
Γ_{144}	$\overline{K}^*(892)^0 \rho^0$		$< 7.67 \times 10^{-4}$	CL=90%
Γ_{145}	$\overline{K}^*(892)^0 K^*(892)^0$		$(1.11 \pm 0.27) \times 10^{-5}$	
Γ_{146}	$K^*(892)^0 \overline{K}_2^*(1430)^0$			
Γ_{147}	$K_2^*(1430)^0 \overline{K}^*(892)^0$			
Γ_{148}	$K_2^*(1430)^0 \overline{K}_2^*(1430)^0$			
Γ_{149}	$\phi K^*(892)^0$		$(1.14 \pm 0.30) \times 10^{-6}$	
Γ_{150}	$p\overline{p}$		$< 4.4 \times 10^{-9}$	CL=90%
Γ_{151}	$p\overline{p} K^+ K^-$		$(4.5 \pm 0.5) \times 10^{-6}$	
Γ_{152}	$p\overline{p} K^+ \pi^-$		$(1.39 \pm 0.26) \times 10^{-6}$	
Γ_{153}	$p\overline{p}\pi^+\pi^-$		$(4.3 \pm 2.0) \times 10^{-7}$	
Γ_{154}	$p\overline{p}p\overline{p}$		$(2.3 \pm 1.0) \times 10^{-8}$	
Γ_{155}	$p\overline{\Lambda} K^- +$ c.c.		$(5.5 \pm 1.0) \times 10^{-6}$	
Γ_{156}	$\Lambda_c^- \Lambda\pi^+$		$(3.6 \pm 1.6) \times 10^{-4}$	
Γ_{157}	$\Lambda_c^- \Lambda_c^+$		$< 8.0 \times 10^{-5}$	CL=95%

Lepton family (*LF*), lepton (*L*), baryon (*B*) number violating modes or $\Delta B = 1$ weak neutral current (*B1*) modes

Γ_{158}	$\gamma\gamma$	*B1*	$< 3.1 \times 10^{-6}$	CL=90%
Γ_{159}	$\phi\gamma$	*B1*	$(3.4 \pm 0.4) \times 10^{-5}$	
Γ_{160}	$f_2(1270)\gamma$	*B1*	$(9 {}^{+4}_{-5}) \times 10^{-6}$	
Γ_{161}	$f_2'(1525)\gamma$	*B1*	$(6.6 {}^{+0.9}_{-0.8}) \times 10^{-6}$	
Γ_{162}	$\phi(1680)\gamma,\ \phi \to K^+ K^-$	*B1*	$(9.2 \pm 2.4) \times 10^{-7}$	
Γ_{163}	$\phi_3(1850)\gamma,\ \phi_3 \to K^+ K^-$	*B1*	$(7 {}^{+6}_{-5}) \times 10^{-8}$	
Γ_{164}	$f_2(2010)\gamma,\ f_2 \to K^+ K^-$	*B1*	$(1.0 {}^{+0.7}_{-0.5}) \times 10^{-7}$	

Γ_{165}	$\mu^+\mu^-$	*B1*		$(3.34 \pm 0.27) \times 10^{-9}$		
Γ_{166}	e^+e^-	*B1*		< 9.4	$\times 10^{-9}$	CL=90%
Γ_{167}	$\tau^+\tau^-$	*B1*		< 6.8	$\times 10^{-3}$	CL=95%
Γ_{168}	$\mu^+\mu^-\gamma$	*B1*		< 4.2	$\times 10^{-8}$	CL=95%
Γ_{169}	$\mu^+\mu^-\mu^+\mu^-$	*B1*		< 8.6	$\times 10^{-10}$	CL=95%
Γ_{170}	SP, $S \to \mu^+\mu^-$, $P \to \mu^+\mu^-$	*B1*	[*b*]	< 2.2	$\times 10^{-9}$	CL=95%
Γ_{171}	aa, $a \to \mu^+\mu^-$	*B1*		< 5.8	$\times 10^{-10}$	CL=95%
Γ_{172}	$\phi(1020)\mu^+\mu^-$	*B1*		$(8.3 \pm 0.4) \times 10^{-7}$		
Γ_{173}	$f_2'(1525)\mu^+\mu^-$	*B1*		$(1.60 \pm 0.22) \times 10^{-7}$		
Γ_{174}	$\overline{K}^*(892)^0\mu^+\mu^-$	*B1*		$(2.9 \pm 1.1) \times 10^{-8}$		
Γ_{175}	$\pi^+\pi^-\mu^+\mu^-$	*B1*		$(8.4 \pm 1.7) \times 10^{-8}$		
Γ_{176}	$\overline{D}^0\mu^+\mu^-$	*B1*		< 1.2	$\times 10^{-7}$	CL=90%
Γ_{177}	$\phi\nu\overline{\nu}$	*B1*		< 5.4	$\times 10^{-3}$	CL=90%
Γ_{178}	invisible	*B1*				
Γ_{179}	$e^\pm\mu^\mp$	*LF*	[*c*]	< 5.4	$\times 10^{-9}$	CL=90%
Γ_{180}	$e^\pm\tau^\mp$	*LF*		< 1.4	$\times 10^{-3}$	CL=90%
Γ_{181}	$\mu^\pm\tau^\mp$	*LF*		< 4.2	$\times 10^{-5}$	CL=95%
Γ_{182}	$\phi\mu^\pm e^\mp$	*LF*		< 1.6	$\times 10^{-8}$	CL=90%
Γ_{183}	$\phi\mu^\pm\tau^\mp$	*LF*		< 1.0	$\times 10^{-5}$	CL=90%
Γ_{184}	$p\mu^-$	*L,B*		< 1.21	$\times 10^{-8}$	CL=90%

[*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.

FIT INFORMATION

An overall fit to 12 branching ratios uses 20 measurements to determine 7 parameters. The overall fit has a $\chi^2 = 27.1$ for 13 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta x_i \delta x_j\right\rangle/(\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$.

x_{17}	17					
x_{19}	82	14				
x_{68}	0	0	0			
x_{75}	0	0	0	43		
x_{78}	0	0	0	31	52	
x_{128}	0	0	0	15	6	5
	x_{15}	x_{17}	x_{19}	x_{68}	x_{75}	x_{78}

B_s^0 BRANCHING RATIOS

$\Gamma(D_s^- \text{ anything})/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.62 ±0.06 OUR AVERAGE					
0.602±0.058±0.023		[1] WANG	22	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
0.91 ±0.18 ±0.41		[2] DRUTSKOY	07	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
0.81 ±0.24 ±0.22	90	[3] BUSKULIC	96E	ALEP	$e^+e^- \rightarrow Z$
1.56 ±0.58 ±0.44	147	[4] ACTON	92N	OPAL	$e^+e^- \rightarrow Z$

[1] WANG 22 selects the B_s events by tagging the accompanying B_s via partial reconstruction of the semileptonic decays $B_s \rightarrow D_s X \ell^+ \nu$.

[2] The extraction of this result takes into account the correlation between the measurements of B($\Upsilon(5S) \rightarrow D_s X$) and B($\Upsilon(5S) \rightarrow D^0 X$).

[3] BUSKULIC 96E separate $c\overline{c}$ and $b\overline{b}$ sources of D_s^+ mesons using a lifetime tag, subtract generic $\overline{b} \rightarrow W^+ \rightarrow D_s^+$ events, and obtain B($\overline{b} \rightarrow B_s^0$) × B($B_s^0 \rightarrow D_s^-$ anything) $= 0.088 \pm 0.020 \pm 0.020$ assuming B($D_s \rightarrow \phi\pi$) $= (3.5 \pm 0.4) \times 10^{-2}$ and PDG 1994 values for the relative partial widths to other D_s channels. We evaluate using our current values B($\overline{b} \rightarrow B_s^0$) $= 0.107 \pm 0.014$ and B($D_s \rightarrow \phi\pi$) $= 0.036 \pm 0.009$. Our first error is their experiment's and our second error is that due to B($\overline{b} \rightarrow B_s^0$) and B($D_s \rightarrow \phi\pi$).

[4] ACTON 92N assume that excess of 147 ± 48 D_s^0 events over that expected from B^0, B^+, and $c\overline{c}$ is all from B_s^0 decay. The product branching fraction is measured to be B($\overline{b} \rightarrow B_s^0$)B($B_s^0 \rightarrow D_s^-$ anything)×B($D_s^- \rightarrow \phi\pi^-$) $= (5.9 \pm 1.9 \pm 1.1) \times 10^{-3}$. We evaluate using our current values B($\overline{b} \rightarrow B_s^0$) $= 0.107 \pm 0.014$ and B($D_s \rightarrow \phi\pi$) $= 0.036 \pm 0.009$. Our first error is their experiment's and our second error is that due to B($\overline{b} \rightarrow B_s^0$) and B($D_s \rightarrow \phi\pi$).

$\Gamma(D_s^\pm \text{ anything})/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
0.92±0.11	ZHUKOVA	23	BELL	$e^+e^- \rightarrow \Upsilon(5S)$

$\Gamma(D^0/\overline{D}^0 \text{ anything})/\Gamma(D_s^\pm \text{ anything})$ Γ_3/Γ_2

VALUE	DOCUMENT ID		TECN	COMMENT
0.416±0.018±0.092	ZHUKOVA	23	BELL	$e^+e^- \rightarrow \Upsilon(5S)$

$\Gamma(\ell\nu_\ell X)/\Gamma_{\text{total}}$ Γ_4/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
9.6±0.8 OUR AVERAGE				
9.6±0.4±0.7	[1] OSWALD	13	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
$9.5^{+2.5}_{-2.0}{}^{+1.1}_{-1.9}$	[2] LEES	12A	BABR	e^+e^-

[1] The measurement corresponds to the average of the electron and muon branching fractions.

[2] The measurement corresponds to a branching fraction where the lepton originates from bottom decay and is the average between the electron and muon branching fractions. LEES 12A uses the correlation of the production of ϕ mesons in association with a lepton in e^+e^- data taken at center-of-mass energies between 10.54 and 11.2 GeV.

$\Gamma(e^+ \nu X^-)/\Gamma_{total}$ — Γ_5/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
9.1±0.5±0.6	OSWALD	13	BELL	$e^+ e^- \to \Upsilon(5S)$

$\Gamma(\mu^+ \nu X^-)/\Gamma_{total}$ — Γ_6/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
10.2±0.6±0.8	OSWALD	13	BELL	$e^+ e^- \to \Upsilon(5S)$

$\Gamma(D_s^- \ell^+ \nu_\ell \text{anything})/\Gamma_{total}$ — Γ_7/Γ

The values and averages in this section serve only to show what values result if one assumes our B($\overline{b} \to B_s^0$). They cannot be thought of as measurements since the underlying product branching fractions were also used to determine B($\overline{b} \to B_s^0$) as described in the note on "Production and Decay of b-Flavored Hadrons."

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
8.1±1.3 OUR AVERAGE					
8.2±0.2±1.5		[1] OSWALD	15	BELL	$e^+ e^- \to \Upsilon(5S)$
7.6±1.2±2.1	134	[2] BUSKULIC	95O	ALEP	$e^+ e^- \to Z$
10.7±4.3±2.9		[3] ABREU	92M	DLPH	$e^+ e^- \to Z$
10.3±3.6±2.8	18	[4] ACTON	92N	OPAL	$e^+ e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
13 ±4 ±4	27	[5] BUSKULIC	92E	ALEP	$e^+ e^- \to Z$

[1] Obtains $B_s \to D_s X e \nu$, and $D_s X \mu \nu$ separately, then combines them by assuming systematic uncertainties are fully correlated, except for the one on lepton identification. The third uncertainty adds in quadrature systematic uncertainties from external sources (number of B_s events, and $D_s^{(*)}$ branching fractions). OSWALD 15 also measures the cross-section $\sigma(e^+ e^- \to B_s^{(*)} \overline{B}_s^{(*)}) = 53.8 \pm 1.4 \pm 5.3$ pb at $\sqrt{s} = 10.86$ GeV.

[2] BUSKULIC 95O use $D_s \ell$ correlations. The measured product branching ratio is B($\overline{b} \to B_s$) × B($B_s \to D_s^- \ell^+ \nu_\ell$anything) = $(0.82 \pm 0.09^{+0.13}_{-0.14})$% assuming B($D_s \to \phi\pi$) = $(3.5 \pm 0.4) \times 10^{-2}$ and PDG 1994 values for the relative partial widths to the six other D_s channels used in this analysis. Combined with results from $\Upsilon(4S)$ experiments this can be used to extract B($\overline{b} \to B_s$) = $(11.0 \pm 1.2^{+2.5}_{-2.6})$%. We evaluate using our current values B($\overline{b} \to B_s^0$) = 0.107 ± 0.014 and B($D_s \to \phi\pi$) = 0.036 ± 0.009. Our first error is their experiment's and our second error is that due to B($\overline{b} \to B_s^0$) and B($D_s \to \phi\pi$).

[3] ABREU 92M measured muons only and obtained product branching ratio B($Z \to b$or $\overline{b}$) × B($\overline{b} \to B_s$) × B($B_s \to D_s \mu^+ \nu_\mu$anything) × B($D_s \to \phi\pi$) = $(18 \pm 8) \times 10^{-5}$. We evaluate using our current values B($\overline{b} \to B_s^0$) = 0.107 ± 0.014 and B($D_s \to \phi\pi$) = 0.036 ± 0.009. Our first error is their experiment's and our second error is that due to B($\overline{b} \to B_s^0$) and B($D_s \to \phi\pi$). We use B($Z \to b$or $\overline{b}$) = 2B($Z \to b\overline{b}$) = 2×(0.2212 ± 0.0019).

[4] ACTON 92N is measured using $D_s \to \phi\pi^+$ and $K^*(892)^0 K^+$ events. The product branching fraction measured is measured to be B($\overline{b} \to B_s^0$)B($B_s^0 \to D_s^- \ell^+ \nu_\ell$anything) ×B($D_s^- \to \phi\pi^-$) = $(3.9 \pm 1.1 \pm 0.8) \times 10^{-4}$. We evaluate using our current values B($\overline{b} \to B_s^0$) = 0.107 ± 0.014 and B($D_s \to \phi\pi$) = 0.036 ± 0.009. Our first error is their experiment's and our second error is that due to B($\overline{b} \to B_s^0$) and B($D_s \to \phi\pi$).

[5] BUSKULIC 92E is measured using $D_s \to \phi\pi^+$ and $K^*(892)^0 K^+$ events. They use $2.7 \pm 0.7\%$ for the $\phi\pi^+$ branching fraction. The average product branching fraction is measured to be $B(\overline{b} \to B_s^0)B(B_s^0 \to D_s^- \ell^+ \nu_\ell \text{anything}) = 0.020 \pm 0.0055^{+0.005}_{-0.006}$. We evaluate using our current values $B(\overline{b} \to B_s^0) = 0.107 \pm 0.014$ and $B(D_s \to \phi\pi) = 0.036 \pm 0.009$. Our first error is their experiment's and our second error is that due to $B(\overline{b} \to B_s^0)$ and $B(D_s \to \phi\pi)$. Superseded by BUSKULIC 95O.

$\Gamma(D_s^{*-} \ell^+ \nu_\ell \text{anything})/\Gamma_{\text{total}}$ Γ_8/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
5.4±0.4±1.0	[1] OSWALD	15	BELL	$e^+ e^- \to \Upsilon(5S)$

[1] Obtains $B_s \to D_s^* X e\nu$, and $D_s^* X \mu\nu$ separately, then combines them by assuming systematic uncertainties are fully correlated, except for the one on lepton identification. The third uncertainty adds in quadrature systematic uncertainties from external sources (number of B_s events, and $D_s^{(*)}$ branching fractions). OSWALD 15 also measures the cross-section $\sigma(e^+ e^- \to B_s^{(*)} \overline{B}_s^{(*)}) = 53.8 \pm 1.4 \pm 5.3$ pb at $\sqrt{s} = 10.86$ GeV.

$\Gamma(D_s^- \mu^+ \nu_\mu)/\Gamma_{\text{total}}$ Γ_9/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
2.29±0.19±0.08	[1] AAIJ	20E	LHCB	pp at 7, 8 TeV

[1] AAIJ 20E reports $[\Gamma(B_s^0 \to D_s^- \mu^+ \nu_\mu)/\Gamma_{\text{total}}] / [B(B^0 \to D^- \ell^+ \nu_\ell)] = 1.09 \pm 0.05 \pm 0.06 \pm 0.05$ which we multiply by our best value $B(B^0 \to D^- \ell^+ \nu_\ell) = (2.10 \pm 0.07) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_s^{*-} \mu^+ \nu_\mu)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
5.2±0.5±0.1	[1] AAIJ	20E	LHCB	pp at 7, 8 TeV

[1] AAIJ 20E reports $[\Gamma(B_s^0 \to D_s^{*-} \mu^+ \nu_\mu)/\Gamma_{\text{total}}] / [B(B^0 \to D^*(2010)^- \ell^+ \nu_\ell)] = 1.06 \pm 0.05 \pm 0.07 \pm 0.05$ which we multiply by our best value $B(B^0 \to D^*(2010)^- \ell^+ \nu_\ell) = (4.87 \pm 0.09) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_s^- \mu^+ \nu_\mu)/\Gamma(D_s^{*-} \mu^+ \nu_\mu)$ Γ_9/Γ_{10}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.464±0.013±0.043	[1] AAIJ	20E	LHCB	pp at 7, 8 TeV

[1] AAIJ 20E value is not independent of other reported measurements.

$\Gamma(D_{s1}(2536)^- \mu^+ \nu_\mu,\ D_{s1}^- \to D^{*-} K_S^0)/\Gamma_{\text{total}}$ Γ_{11}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
2.7±0.7±0.2	[1] ABAZOV	09G	D0	$p\overline{p}$ at 1.96 TeV

[1] ABAZOV 09G reports $[\Gamma(B_s^0 \to D_{s1}(2536)^- \mu^+ \nu_\mu,\ D_{s1}^- \to D^{*-} K_S^0)/\Gamma_{\text{total}}] \times [B(\overline{b} \to B_s^0)] = (2.66 \pm 0.52 \pm 0.45) \times 10^{-4}$ which we divide by our best value $B(\overline{b} \to B_s^0) = (10.0 \pm 0.8) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_{s1}(2536)^- X \mu^+ \nu,\ D_{s1}^- \to \overline{D}^0 K^+)/\Gamma(D_s^- \ell^+ \nu_\ell \text{anything})$ — Γ_{12}/Γ_7

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
5.4±1.2±0.5	AAIJ	11A	LHCB	pp at 7 TeV

$\Gamma(D_{s2}(2573)^- X \mu^+ \nu,\ D_{s2}^- \to \overline{D}^0 K^+)/\Gamma(D_s^- \ell^+ \nu_\ell \text{anything})$ — Γ_{13}/Γ_7

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
3.3±1.0±0.4	AAIJ	11A	LHCB	pp at 7 TeV

$\Gamma(D_{s1}(2536)^- X \mu^+ \nu,\ D_{s1}^- \to \overline{D}^0 K^+)/\Gamma(D_{s2}(2573)^- X \mu^+ \nu,\ D_{s2}^- \to \overline{D}^0 K^+)$ — Γ_{12}/Γ_{13}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.61±0.14±0.05	[1] AAIJ	11A	LHCB	pp at 7 TeV

[1] Not independent of other AAIJ 11A measurements.

$\Gamma(K^- \mu^+ \nu_\mu)/\Gamma(D_s^- \mu^+ \nu_\mu)$ — Γ_{14}/Γ_9

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
4.89±0.21±0.25	[1,2] AAIJ	21G	LHCB	pp at 8 TeV

[1] AAIJ 21G measures B($B_s^0 \to K^- \mu^+ \nu_\mu$)/B($B_s^0 \to D_s^- \mu^+ \nu_\mu$) = $(4.89 \pm 0.21 ^{+0.20}_{-0.21} \pm 0.14) \times 10^{-3}$ over the whole q^2 range, where the last uncertainty is due to the $D_s^- \to K^+ K^- \pi^-$ branching fraction.

[2] AAIJ 21G reports this branching ratio for $q^2 < 7$ GeV^2 as $(1.66 \pm 0.08 \pm 0.07 \pm 0.05) \times 10^{-3}$ and for $q^2 > 7$ GeV^2 as $(3.25 \pm 0.21 ^{+0.16}_{-0.17} \pm 0.09) \times 10^{-3}$.

$\Gamma(K^- \mu^+ \nu_\mu)/\Gamma_{\text{total}}$ — Γ_{14}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.06±0.05±0.08	[1] AAIJ	21G	LHCB	pp at 8 TeV

[1] The total systematic error includes D_s^- branching fractions, B_s^0 lifetime, $|V_{cb}|$, and $B_s^0 \to D_s^-$ form factor integral uncertainties.

$\Gamma(D_s^- \pi^+)/\Gamma_{\text{total}}$ — Γ_{15}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.98±0.14 OUR FIT					
2.97±0.13 OUR AVERAGE					
2.96±0.10±0.09		[1] AAIJ	21Y	LHCB	pp at 7, 8, 13 TeV
3.6 ±0.5 ±0.5		[2] LOUVOT	09	BELL	$e^+ e^- \to \Upsilon(5S)$
2.8 ±0.6 ±0.1		[3] ABULENCIA	07C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2.95 \pm 0.05 ^{+0.25}_{-0.28}$		[4] AAIJ	12AG	LHCB	Repl. by AAIJ 21Y
6.8 ±2.2 ±1.6		DRUTSKOY	07A	BELL	Repl. by LOUVOT 09
3.3 ±1.1 ±0.1		[5] ABULENCIA	06J	CDF	Repl. by ABULENCIA 07C
<130	6	[6] AKERS	94J	OPAL	$e^+ e^- \to Z$
seen	1	BUSKULIC	93G	ALEP	$e^+ e^- \to Z$

[1] AAIJ 21Y reports [$\Gamma(B_s^0 \to D_s^- \pi^+)/\Gamma_{\text{total}}$] / [B($B^0 \to D^- \pi^+$)] = 1.18 ± 0.04 which we multiply by our best value B($B^0 \to D^- \pi^+$) = $(2.51 \pm 0.08) \times 10^{-3}$. Our first

error is their experiment's error and our second error is the systematic error from using our best value.

[2] LOUVOT 09 reports $(3.67^{+0.35}_{-0.33}{}^{+0.65}_{-0.645}) \times 10^{-3}$ from a measurement of $[\Gamma(B^0_s \to D^-_s \pi^+)/\Gamma_{total}] \times [B(\Upsilon(10860) \to B^{(*)}_s \overline{B}^{(*)}_s)]$ assuming $B(\Upsilon(10860) \to B^{(*)}_s \overline{B}^{(*)}_s) = (19.5 \pm 2.6) \times 10^{-2}$, which we rescale to our best value $B(\Upsilon(10860) \to B^{(*)}_s \overline{B}^{(*)}_s) = (20.1 \pm 3.1) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] ABULENCIA 07C reports $[\Gamma(B^0_s \to D^-_s \pi^+)/\Gamma_{total}] / [B(B^0 \to D^- \pi^+)] = 1.13 \pm 0.08 \pm 0.23$ which we multiply by our best value $B(B^0 \to D^- \pi^+) = (2.51 \pm 0.08) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] AAIJ 12AG reports $(2.95 \pm 0.05 \pm 0.17^{+0.18}_{-0.22}) \times 10^{-3}$ where the last uncertainty comes from the semileptonic f_s/f_d measurement. We combined the systematics in quadrature.

[5] ABULENCIA 06J reports $[\Gamma(B^0_s \to D^-_s \pi^+)/\Gamma_{total}] / [B(B^0 \to D^- \pi^+)] = 1.32 \pm 0.18 \pm 0.38$ which we multiply by our best value $B(B^0 \to D^- \pi^+) = (2.51 \pm 0.08) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[6] AKERS 94J sees ≤ 6 events and measures the limit on the product branching fraction $f(\overline{b} \to B^0_s) \cdot B(B^0_s \to D^-_s \pi^+) < 1.3\%$ at CL = 90%. We divide by our current value $B(\overline{b} \to B^0_s) = 0.105$.

$\Gamma(D^-_s \rho^+)/\Gamma(D^-_s \pi^+)$ — Γ_{16}/Γ_{15}

VALUE	DOCUMENT ID		TECN	COMMENT
2.3±0.4±0.2	LOUVOT	10	BELL	$e^+ e^- \to \Upsilon(5S)$

$\Gamma(D^-_s \pi^+ \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
6.1±1.0 OUR FIT				
6.3±1.4±0.6	[1] ABULENCIA	07C	CDF	$p\overline{p}$ at 1.96 TeV

[1] ABULENCIA 07C reports $[\Gamma(B^0_s \to D^-_s \pi^+ \pi^+ \pi^-)/\Gamma_{total}] / [B(B^0 \to D^- \pi^+ \pi^+ \pi^-)] = 1.05 \pm 0.10 \pm 0.22$ which we multiply by our best value $B(B^0 \to D^- \pi^+ \pi^+ \pi^-) = (6.0 \pm 0.6) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D^-_s \pi^+ \pi^+ \pi^-)/\Gamma(D^-_s \pi^+)$ — Γ_{17}/Γ_{15}

VALUE	DOCUMENT ID		TECN	COMMENT
2.05±0.33 OUR FIT				
2.01±0.37±0.20	AAIJ	11E	LHCB	pp at 7 TeV

$\Gamma(D_{s1}(2536)^- \pi^+,\ D^-_{s1} \to D^-_s \pi^+ \pi^-)/\Gamma(D^-_s \pi^+ \pi^+ \pi^-)$ — Γ_{18}/Γ_{17}

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
4.0±1.0±0.4	AAIJ	12AX	LHCB	pp at 7 TeV

$\Gamma(D^{\mp}_s K^{\pm})/\Gamma_{total}$ — Γ_{19}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
2.25±0.12 OUR FIT				
$2.3^{+1.2}_{-1.0}{}^{+0.4}_{-0.3}$	[1] LOUVOT	09	BELL	$e^+ e^- \to \Upsilon(5S)$

[1] LOUVOT 09 reports $(2.4^{+1.2}_{-1.0} \pm 0.42) \times 10^{-4}$ from a measurement of $[\Gamma(B^0_s \to D^{\mp}_s K^{\pm})/\Gamma_{\text{total}}] \times [B(\Upsilon(10860) \to B^{(*)}_s \overline{B}^{(*)}_s)]$ assuming $B(\Upsilon(10860) \to B^{(*)}_s \overline{B}^{(*)}_s) = (19.5 \pm 2.6) \times 10^{-2}$, which we rescale to our best value $B(\Upsilon(10860) \to B^{(*)}_s \overline{B}^{(*)}_s) = (20.1 \pm 3.1) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D_{s1}(2536)^{\mp} K^{\pm},\ D^-_{s1} \to \overline{D}^*(2007)^0 K^-)/\Gamma_{\text{total}}$ — Γ_{20}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
2.48±0.18±0.22	[1] AAIJ	23AY	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 23AY reports $[\Gamma(B^0_s \to D_{s1}(2536)^{\mp} K^{\pm},\ D^-_{s1} \to \overline{D}^*(2007)^0 K^-)/\Gamma_{\text{total}}] / [B(B^0 \to \overline{D}^0 K^+ K^-)] = 0.409 \pm 0.019 \pm 0.022$ which we multiply by our best value $B(B^0 \to \overline{D}^0 K^+ K^-) = (6.1 \pm 0.5) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D^{\mp}_s K^{\pm})/\Gamma(D^-_s \pi^+)$ — Γ_{19}/Γ_{15}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
7.55±0.24 OUR FIT				
7.55±0.24 OUR AVERAGE				
7.52±0.15±0.19	AAIJ	15AC	LHCB	pp at 7, 8 TeV
9.7 ±1.8 ±0.9	AALTONEN	09AQ	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
6.46±0.43±0.25	AAIJ	12AG	LHCB	Repl. by AAIJ 15AC

$\Gamma(D^-_s K^+ \pi^+ \pi^-)/\Gamma(D^-_s \pi^+ \pi^+ \pi^-)$ — Γ_{21}/Γ_{17}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
5.2±0.5±0.3	AAIJ	12AX	LHCB	pp at 7 TeV

$\Gamma(D^+_s D^-_s)/\Gamma_{\text{total}}$ — Γ_{22}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
4.5±0.6 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
4.0±0.2±0.5		[1] AAIJ	13AP	LHCB	pp at 7 TeV
$5.8^{+1.1}_{-0.9}\pm1.3$		[2] ESEN	13	BELL	$e^+ e^- \to \Upsilon(5S)$
6.1±0.9±0.7		[3] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$10.3^{+3.9}_{-3.2}{}^{+2.6}_{-2.5}$		[4] ESEN	10	BELL	Repl. by ESEN 13
12 ±4 ±1		[5] AALTONEN	08F	CDF	Repl. by AALTONEN 12C
<67	90	DRUTSKOY	07A	BELL	Repl. by ESEN 10

[1] Uses $B(B^0 \to D^- D^+_s) = (7.2 \pm 0.8) \times 10^{-3}$.

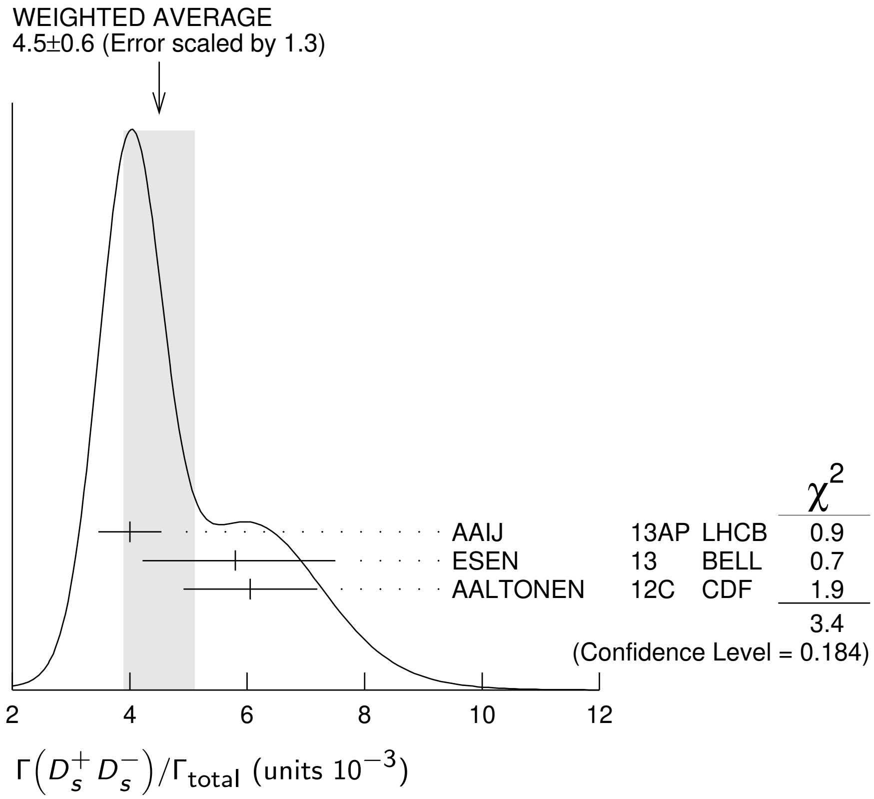
[2] Use $\Upsilon(5S) \to B^*_s \overline{B}^*_s$ decays assuming $B(\Upsilon(5S) \to B^*_s \overline{B}^*_s) = (17.1 \pm 3.0)\%$ and $\Gamma(\Upsilon(5S) \to B^*_s \overline{B}^*_s)\ /\ \Gamma(\Upsilon(5S) \to B^{(*)}_s \overline{B}^{(*)}_s) = (87.0 \pm 1.7)\%$.

[3] AALTONEN 12C reports $(f_s/f_d)\ (B(B^0_s \to D^+_s D^-_s)\ /\ B(B^0 \to D^- D^+_s)) = 0.183 \pm 0.021 \pm 0.017$. We multiply this result by our best value of $B(B^0 \to D^- D^+_s) = (8.1 \pm 0.6) \times 10^{-3}$ and divide by our best value of f_s/f_d, where $1/2\ f_s/f_d = 0.1230 \pm 0.0115$.

Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values.

[4] Uses $\Upsilon(10860) \to B_s^* \overline{B}_s^*$ assuming $B(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (90.1^{+3.8}_{-4.0})\%$.

[5] AALTONEN 08F reports $[\Gamma(B_s^0 \to D_s^+ D_s^-)/\Gamma_{\text{total}}] / [B(B^0 \to D^- D_s^+)] = 1.44^{+0.48}_{-0.44}$ which we multiply by our best value $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.



$\Gamma(D_s^- D^+)/\Gamma_{\text{total}}$ Γ_{23}/Γ

VALUE (units 10^{-4})	*DOCUMENT ID*	*TECN*	*COMMENT*
3.1±0.4±0.2	[1] AAIJ 14AA	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
3.6±0.6±0.5	[2] AAIJ 13AP	LHCB	Repl. by AAIJ 14AA

[1] AAIJ 14AA reports $[\Gamma(B_s^0 \to D_s^- D^+)/\Gamma_{\text{total}}] / [B(B^0 \to D^- D_s^+)] = 0.038 \pm 0.004 \pm 0.003$ which we multiply by our best value $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value..

[2] Uses $B(B^0 \to D^- D_s^+) = (7.2 \pm 0.8) \times 10^{-3}$.

$\Gamma(D^+ D^-)/\Gamma_{\text{total}}$ Γ_{24}/Γ

VALUE (units 10^{-4})	*DOCUMENT ID*	*TECN*	*COMMENT*
2.2±0.4±0.4	[1] AAIJ 13AP	LHCB	pp at 7 TeV

[1] Uses B($B^0 \to D^- D^+$) = $(2.11 \pm 0.31) \times 10^{-4}$ and B($B^+ \to \overline{D}^0 D_s^+$) = $(10.1 \pm 1.7) \times 10^{-3}$.

$\Gamma(D^0 \overline{D}^0)/\Gamma_{total}$ — Γ_{28}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.9±0.3±0.4	[1] AAIJ	13AP	LHCB	pp at 7 TeV

[1] Uses B($B^0 \to D^- D^+$) = $(2.11 \pm 0.31) \times 10^{-4}$ and B($B^+ \to \overline{D}^0 D_s^+$) = $(10.1 \pm 1.7) \times 10^{-3}$.

$\Gamma(D^{*+} D^{*-})/\Gamma_{total}$ — Γ_{27}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.14 \pm 0.28^{+0.17}_{-0.16}}$	[1,2] AAIJ	23J	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 23J reports $[\Gamma(B_s^0 \to D^{*+} D^{*-})/\Gamma_{total}]$ / [B($B^0 \to D^*(2010)^+ D^*(2010)^-$)] = $0.269 \pm 0.032 \pm 0.011 \pm 0.008$ which we multiply by our best value B($B^0 \to D^*(2010)^+ D^*(2010)^-$) = $(8.0 \pm 0.6) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.
[2] Uses average B_s^0 lifetime of 1.5215 ps.

$\Gamma(D_s^{*-} \pi^+)/\Gamma(D_s^- \pi^+)$ — Γ_{29}/Γ_{15}

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.65^{+0.15}_{-0.13} \pm 0.07}$	LOUVOT	10	BELL	$e^+ e^- \to \Upsilon(5S)$

$\Gamma(D_s^{*\mp} K^\pm)/\Gamma(D_s^{*-} \pi^+)$ — Γ_{30}/Γ_{29}

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.068 \pm 0.005^{+0.003}_{-0.002}}$	AAIJ	15AD	LHCB	pp at 7, 8 TeV

$\Gamma(D_s^{*-} \rho^+)/\Gamma(D_s^- \pi^+)$ — Γ_{31}/Γ_{15}

VALUE	DOCUMENT ID		TECN	COMMENT
3.2±0.6±0.3	LOUVOT	10	BELL	$e^+ e^- \to \Upsilon(5S)$

$\Gamma(D_s^{*-} \rho^+)/\Gamma(D_s^- \rho^+)$ — Γ_{31}/Γ_{16}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.4±0.3±0.1	[1] LOUVOT	10	BELL	$e^+ e^- \to \Upsilon(5S)$

[1] Not independent of other LOUVOT 10 measurements.

$[\Gamma(D_s^{*+} D_s^-) + \Gamma(D_s^{*-} D_s^+)]/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
15.1±1.3 OUR AVERAGE					
15.3±1.2±1.1		[1] AAIJ	16P	LHCB	pp at 7 TeV
$17.6^{+2.3}_{-2.2} \pm 4.0$		[2] ESEN	13	BELL	$e^+ e^- \to \Upsilon(5S)$
14.0±1.9±1.6		[3] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$27.5^{+8.3}_{-7.1} \pm 6.9$		[4] ESEN	10	BELL	Repl. by ESEN 13
<121	90	DRUTSKOY	07A	BELL	Repl. by ESEN 10

[1] AAIJ 16P reports $[\left[\Gamma(B_s^0 \to D_s^{*+} D_s^-) + \Gamma(D_s^{*-} D_s^+)\right]/\Gamma_{\text{total}}] / [B(B^0 \to D^- D_s^+)] = 1.88 \pm 0.08 \pm 0.12$ which we multiply by our best value $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

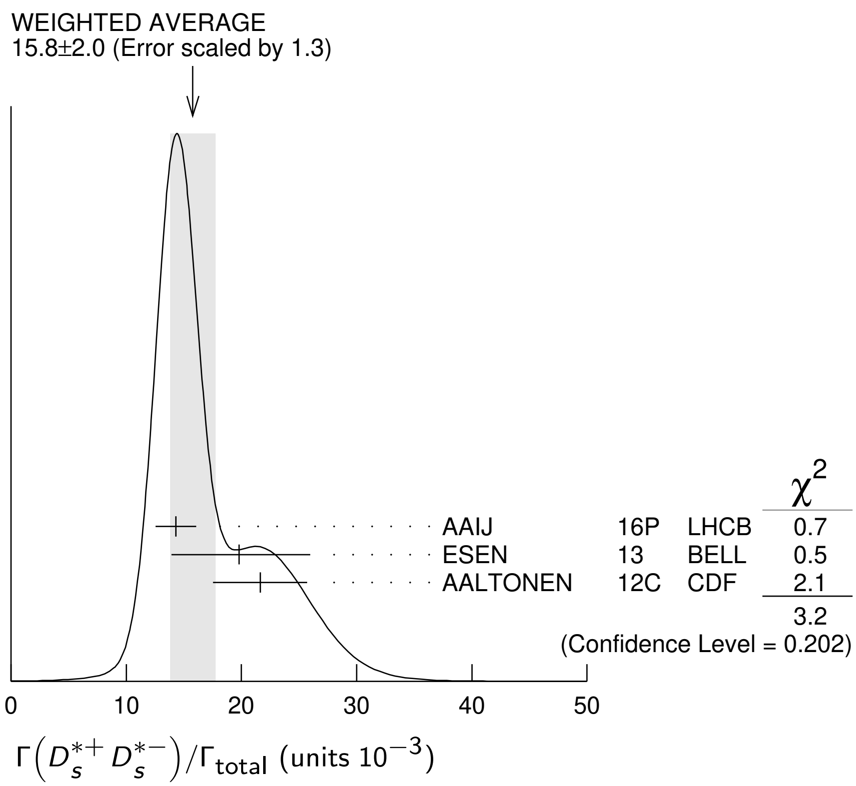
[2] Use $\Upsilon(5S) \to B_s^* \overline{B}_s^*$ decays assuming $B(\Upsilon(5S) \to B_s^* \overline{B}_s^*) = (17.1 \pm 3.0)\%$ and $\Gamma(\Upsilon(5S) \to B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(5S) \to B_s^{(*)} \overline{B}_s^{(*)}) = (87.0 \pm 1.7)\%$.

[3] AALTONEN 12C reports (f_s/f_d) $(B(B_s^0 \to D_s^{*+} D_s^- + D_s^{*-} D_s^+) / B(B^0 \to D^- D_s^+)) = 0.424 \pm 0.046 \pm 0.035$. We multiply this result by our best value of $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$ and divide by our best value of f_s/f_d, where $1/2\ f_s/f_d = 0.1230 \pm 0.0115$. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values.

[4] Uses $\Upsilon(10860) \to B_s^* \overline{B}_s^*$ assuming $B(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (90.1^{+3.8}_{-4.0})\%$.

$\Gamma(D_s^{*+} D_s^{*-})/\Gamma_{\text{total}}$ — Γ_{33}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
15.8± 2.0 OUR AVERAGE		Error includes scale factor of 1.3. See the ideogram below.			
$14.3 \pm 1.4 \pm 1.0$		[1] AAIJ	16P	LHCB	pp at 7 TeV
$19.8^{+3.3+5.2}_{-3.1-5.0}$		[2] ESEN	13	BELL	$e^+ e^- \to \Upsilon(5S)$
$21.6 \pm 3.2 \pm 2.5$		[3] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$30.8^{+12.2+8.5}_{-10.4-8.6}$		[4] ESEN	10	BELL	Repl. by ESEN 13
<257	90	DRUTSKOY	07A	BELL	Repl. by ESEN 10



[1] AAIJ 16P reports $[\Gamma(B_s^0 \to D_s^{*+} D_s^{*-})/\Gamma_{total}] / [B(B^0 \to D^- D_s^+)] = 1.76 \pm 0.11 \pm 0.14$ which we multiply by our best value $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Use $\Upsilon(5S) \to B_s^* \overline{B}_s^*$ decays assuming $B(\Upsilon(5S) \to B_s^* \overline{B}_s^*) = (17.1 \pm 3.0)\%$ and $\Gamma(\Upsilon(5S) \to B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(5S) \to B_s^{(*)} \overline{B}_s^{(*)}) = (87.0 \pm 1.7)\%$.

[3] AALTONEN 12C reports $(f_s/f_d)\,(B(B_s^0 \to D_s^{*+} D_s^{*-}) / B(B^0 \to D^- D_s^+)) = 0.654 \pm 0.072 \pm 0.065$. We multiply this result by our best value of $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$ and divide by our best value of f_s/f_d, where $1/2\ f_s/f_d = 0.1230 \pm 0.0115$. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values.

[4] Uses $\Upsilon(10860) \to B_s^* \overline{B}_s^*$ assuming $B(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (90.1^{+3.8}_{-4.0})\%$.

$\Gamma(D_s^{(*)+} D_s^{(*)-})/\Gamma_{total}$ Γ_{34}/Γ

VALUE (%)	CL%	DOCUMENT ID		TECN	COMMENT
4.5 ±1.4 OUR EVALUATION		(Produced by HFLAV)			
3.66±0.29 OUR AVERAGE					
$3.45 \pm 0.25 \pm 0.24$		[1] AAIJ	16P	LHCB	pp at 7 TeV
$4.32^{+0.42}_{-0.39}{}^{+1.04}_{-1.03}$		[2] ESEN	13	BELL	$e^+ e^- \to \Upsilon(5S)$
$4.2 \pm 0.5 \pm 0.5$		[3] AALTONEN	12C	CDF	$p\overline{p}$ at 1.96 TeV
$3.5 \pm 1.0 \pm 1.1$		[4] ABAZOV	09I	D0	$p\overline{p}$ at 1.96 TeV
$14 \pm 6 \pm 3$		[5,6] BARATE	00K	ALEP	$e^+ e^- \to Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$6.85^{+1.53}_{-1.30}{}^{+1.79}_{-1.80}$		[7,8] ESEN	10	BELL	Repl. by ESEN 13
$3.9^{+1.9}_{-1.7}{}^{+1.6}_{-1.5}$		[4] ABAZOV	07Y	D0	Repl. by ABAZOV 09I
<0.218	90	BARATE	98Q	ALEP	$e^+ e^- \to Z$

[1] AAIJ 16P reports $[\Gamma(B_s^0 \to D_s^{(*)+} D_s^{(*)-})/\Gamma_{total}] / [B(B^0 \to D^- D_s^+)] = 4.24 \pm 0.14 \pm 0.27$ which we multiply by our best value $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Use $\Upsilon(5S) \to B_s^* \overline{B}_s^*$ decays assuming $B(\Upsilon(5S) \to B_s^* \overline{B}_s^*) = (17.1 \pm 3.0)\%$ and $\Gamma(\Upsilon(5S) \to B_s^* \overline{B}_s^*) / \Gamma(\Upsilon(5S) \to B_s^{(*)} \overline{B}_s^{(*)}) = (87.0 \pm 1.7)\%$.

[3] AALTONEN 12C reports $(f_s/f_d)\,(B(B_s^0 \to D_s^{(*)+} D_s^{(*)-}) / B(B^0 \to D^- D_s^+)) = 1.261 \pm 0.095 \pm 0.112$. We multiply this result by our best value of $B(B^0 \to D^- D_s^+) = (8.1 \pm 0.6) \times 10^{-3}$ and divide by our best value of f_s/f_d, where $1/2\ f_s/f_d = 0.1230 \pm 0.0115$. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values.

[4] Uses the final states where $D_s^+ \to \phi\pi^+$ and $D_s^- \to \phi\mu^- \overline{\nu}_\mu$.

[5] Reports $B(B_s^0(\text{short}) \to D_s^{(*)} D_s^{(*)}) = (0.23 \pm 0.10 \pm 0.05) \cdot [0.17/B(D_s \to \phi\chi)]^2$ assuming $B(B_s^0 \to B_s^0(\text{short})) = 50\%$. We use our best value of $B(D_s \to \phi\chi) = 15.7 \pm 1.0\%$ to obtain the quoted result.

[6] Uses $\phi\phi$ correlations from $B_s^0(\text{short}) \to D_s^{(*)+} D_s^{(*)-}$.

[7] Sum of exclusive $B_s \to D_s^+ D_s^-$, $B_s \to D_s^{*\pm} D_s^{\mp}$ and $B_s \to D_s^{*+} D_s^{*-}$.

[8] Uses $\Upsilon(10860) \to B_s^* \overline{B}_s^*$ assuming $B(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \to B_s^* \overline{B}_s^*)$ / $\Gamma(\Upsilon(10860) \to B_s^{(*)} \overline{B}_s^{(*)}) = (90.1^{+3.8}_{-4.0})\%$.

$\Gamma(D^{*-} D_s^+)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.0±0.6±0.4	[1] AAIJ	21S	LHCB	pp at 13 TeV

[1] AAIJ 21S reports $[\Gamma(B_s^0 \to D^{*-} D_s^+)/\Gamma_{total}]$ / $[B(B^0 \to D^*(2010)^- D_s^+)] = 0.049 \pm 0.006 \pm 0.0036$ which we multiply by our best value $B(B^0 \to D^*(2010)^- D_s^+) = (8.2 \pm 0.8) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\left[\Gamma(D^{*+} D^-) + \Gamma(D^{*-} D^+)\right]/\Gamma_{total}$ — $(\Gamma_{25}+\Gamma_{26})/\Gamma$

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
8.4±1.1±0.8	[1] AAIJ	21N	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 21N reports $[\left[\Gamma(B_s^0 \to D^{*+} D^-) + \Gamma(B_s^0 \to D^{*-} D^+)\right]/\Gamma_{total}]$ / $[B(B^0 \to D^\pm D^{*\mp}$ (CP-averaged))] $= 0.137 \pm 0.017 \pm 0.006$ which we multiply by our best value $B(B^0 \to D^\pm D^{*\mp}$ (CP-averaged)) $= (6.1 \pm 0.6) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^{*0} \overline{K}^0)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
2.8±1.0±0.5	[1] AAIJ	16C	LHCB	pp at 7, 8 TeV

[1] Measured and normalized to the $B_s^0 \to \overline{D}^{*0} K_S^0$ decay with $f_s/f_d = 0.259 \pm 0.015$. Signal significance is 4.4 standard deviations.

$\Gamma(\overline{D}^0 \overline{K}^0)/\Gamma_{total}$ — Γ_{37}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.3±0.5±0.7	[1] AAIJ	16C	LHCB	pp at 7, 8 TeV

[1] Measured and normalized to the $B^0 \to \overline{D}^0 K_S^0$ decay with $f_s/f_d = 0.259 \pm 0.015$.

$\Gamma(\overline{D}^0 K^- \pi^+)/\Gamma_{total}$ — Γ_{38}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
10.4±1.1±0.5	[1] AAIJ	13AQ	LHCB	pp at 7 TeV

[1] AAIJ 13AQ reports $[\Gamma(B_s^0 \to \overline{D}^0 K^- \pi^+)/\Gamma_{total}]$ / $[B(B^0 \to \overline{D}^0 \pi^+ \pi^-)] = 1.18 \pm 0.05 \pm 0.12$ which we multiply by our best value $B(B^0 \to \overline{D}^0 \pi^+ \pi^-) = (8.8 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^*(2007)^0 K^- \pi^+)/\Gamma_{total}$ — Γ_{39}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
7.3±0.6±2.5	[1] AAIJ	22N	LHCB	pp at 13 TeV

[1] AAIJ 22N reports $[\Gamma(B_s^0 \to \overline{D}^*(2007)^0 K^- \pi^+)/\Gamma_{total}]$ / $[B(B^0 \to \overline{D}^*(2007)^0 \pi^+ \pi^-)] = 1.178 \pm 0.029 \pm 0.091 \pm 0.037$ which we multiply by our best value $B(B^0 \to \overline{D}^*(2007)^0 \pi^+ \pi^-) = (6.2 \pm 2.2) \times 10^{-4}$. Our first

error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^0 \overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{40}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
4.4 ±0.6 OUR AVERAGE				
4.29±0.09±0.65	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV
4.7 ±1.2 ±0.3	[2] AAIJ	11D	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.5 ±0.4 ±0.4	[3] AAIJ	13BX	LHCB	Repl. by AAIJ 14BH

[1] Uses Dalitz plot analysis of $B_s^0 \to \overline{D}^0 K^- \pi^+$ decays.

[2] AAIJ 11D reports $[\Gamma(B_s^0 \to \overline{D}^0 \overline{K}^*(892)^0)/\Gamma_{total}] / [B(B^0 \to \overline{D}^0 \rho^0)] = 1.48 \pm 0.34 \pm 0.19$ which we multiply by our best value $B(B^0 \to \overline{D}^0 \rho^0) = (3.21 \pm 0.21) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] AAIJ 13BX reports $[\Gamma(B_s^0 \to \overline{D}^0 \overline{K}^*(892)^0)/\Gamma_{total}] / [B(B^0 \to \overline{D}^0 K^*(892)^0)] = 7.8 \pm 0.7 \pm 0.3 \pm 0.6$ which we multiply by our best value $B(B^0 \to \overline{D}^0 K^*(892)^0) = (4.5 \pm 0.6) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^0 \overline{K}^*(1410))/\Gamma_{total}$ — Γ_{41}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
38.6±11.4±33.3	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B_s^0 \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 \overline{K}_0^*(1430))/\Gamma_{total}$ — Γ_{42}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
30.0±2.4±6.8	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B_s^0 \to \overline{D}^0 K^- \pi^+$ decays. Corresponds to the resonant $K_0^*(1430)$ part of LASS parametrization.

$\Gamma(\overline{D}^0 \overline{K}_2^*(1430))/\Gamma_{total}$ — Γ_{43}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
11.1±1.8±3.8	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B_s^0 \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 \overline{K}^*(1680))/\Gamma_{total}$ — Γ_{44}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<7.8	90	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B_s^0 \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 \overline{K}_0^*(1950))/\Gamma_{total}$ — Γ_{45}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<11	90	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B_s^0 \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 \overline{K}^*_3(1780))/\Gamma_{total}$ — Γ_{46}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<2.6	90	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 \overline{K}^*_4(2045))/\Gamma_{total}$ — Γ_{47}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<3.1	90	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 K^- \pi^+ (\text{non-resonant}))/\Gamma_{total}$ — Γ_{48}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
20.6±3.8±7.3	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays. Corresponds to the non-resonant part of the LASS parametrization.

$\Gamma([K^+ K^-]_D \overline{K}^*(892)^0)/\Gamma(\overline{D}^0 \overline{K}^*(892)^0)$ — Γ_{49}/Γ_{40}

VALUE	DOCUMENT ID		TECN	COMMENT
1.000±0.034±0.016	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$\Gamma([\pi^+ \pi^-]_D \overline{K}^*(892)^0)/\Gamma(\overline{D}^0 \overline{K}^*(892)^0)$ — Γ_{50}/Γ_{40}

VALUE	DOCUMENT ID		TECN	COMMENT
0.996±0.057±0.023	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$\Gamma([\pi^+ \pi^- \pi^+ \pi^-]_D \overline{K}^*(892)^0)/\Gamma(\overline{D}^0 \overline{K}^*(892)^0)$ — Γ_{53}/Γ_{40}

VALUE	DOCUMENT ID		TECN	COMMENT
1.010±0.048±0.033	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$\Gamma(D^*_{s2}(2573)^- \pi^+,\ D^*_{s2} \to \overline{D}^0 K^-)/\Gamma_{total}$ — Γ_{56}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
25.7±0.7±4.0	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(D^*_{s1}(2700)^- \pi^+,\ D^*_{s1} \to \overline{D}^0 K^-)/\Gamma_{total}$ — Γ_{57}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.6±0.4±0.7	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(D^*_{s1}(2860)^- \pi^+,\ D^*_{s1} \to \overline{D}^0 K^-)/\Gamma_{total}$ — Γ_{58}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
5.0±1.2±3.4	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(D^*_{s3}(2860)^- \pi^+,\ D^*_{s3} \to \overline{D}^0 K^-)/\Gamma_{total}$ — Γ_{59}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
2.2±0.1±0.6	[1] AAIJ	14BH	LHCB	pp at 7, 8 TeV

[1] Uses Dalitz plot analysis of $B^0_s \to \overline{D}^0 K^- \pi^+$ decays.

$\Gamma(\overline{D}^0 K^+ K^-)/\Gamma_{total}$ — Γ_{60}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
5.6±0.7±0.5	[1] AAIJ	18AZ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.5±2.0±0.5	[2,3] AAIJ	12AM	LHCB	Repl. by AAIJ 18AZ

[1] AAIJ 18AZ reports $[\Gamma(B_s^0 \to \overline{D}^0 K^+ K^-)/\Gamma_{total}] / [B(B^0 \to \overline{D}^0 K^+ K^-)] = 0.930 \pm 0.089 \pm 0.069$ which we multiply by our best value $B(B^0 \to \overline{D}^0 K^+ K^-) = (6.1 \pm 0.5) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] AAIJ 12AM reports $[\Gamma(B_s^0 \to \overline{D}^0 K^+ K^-)/\Gamma_{total}] / [B(B^0 \to \overline{D}^0 K^+ K^-)] = 0.90 \pm 0.27 \pm 0.20$ which we multiply by our best value $B(B^0 \to \overline{D}^0 K^+ K^-) = (6.1 \pm 0.5) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Uses $B(b \to B_s^0)/B(b \to B^0) = 0.267^{+0.023}_{-0.020}$ measured by the same authors.

$\Gamma(\overline{D}^0 f_0(980))/\Gamma_{total}$ — Γ_{61}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.1 × 10^{-6}	90	AAIJ	15AG	LHCB	pp at 7, 8 TeV

$\Gamma(\overline{D}^0 \phi)/\Gamma_{total}$ — Γ_{62}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
2.30±0.10±0.23	[1] AAIJ	23AZ	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.0 ±0.4 ±0.2	[2] AAIJ	18AY	LHCB	Repl. by AAIJ 23AZ

[1] AAIJ 23AZ result's last uncertainty includes the uncertainty of the branching fraction of $B(B^0 \to \overline{D}^0 K^+ K^-)$ and of f_s/f_d ratio.

[2] AAIJ 18AY reports $[\Gamma(B_s^0 \to \overline{D}^0 \phi)/\Gamma_{total}] / [B(B^0 \to \overline{D}^0 \pi^+ \pi^-)] = (3.4 \pm 0.4 \pm 0.3) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to \overline{D}^0 \pi^+ \pi^-) = (8.8 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\overline{D}^0 \phi)/\Gamma(\overline{D}^0 \overline{K}^*(892)^0)$ — Γ_{62}/Γ_{40}

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.069±0.013±0.007	AAIJ	13BX	LHCB	Repl. by AAIJ 18AY

$\Gamma(\overline{D}^{*0} \phi)/\Gamma_{total}$ — Γ_{63}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
3.17±0.16±0.32	[1] AAIJ	23AZ	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.7 ±0.6 ±0.2	[2] AAIJ	18AY	LHCB	Repl. by AAIJ 23AZ

[1] AAIJ 23AZ result's last uncertainty includes the uncertainties of the branching fraction of $B(B^0 \to \overline{D}^0 K^+ K^-)$ and of f_s/f_d ratio.

[2] AAIJ 18AY reports $[\Gamma(B_s^0 \to \overline{D}^{*0} \phi)/\Gamma_{total}] / [B(B^0 \to \overline{D}^0 \pi^+ \pi^-)] = (4.2 \pm 0.5 \pm 0.4) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to \overline{D}^0 \pi^+ \pi^-) = (8.8 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(D^{*\mp}\pi^{\pm})/\Gamma_{total}$ — Γ_{64}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.1\times10^{-6}$	90	[1] AAIJ	13AL	LHCB	pp at 7 TeV

[1] Uses $f_s/f_d = 0.256 \pm 0.020$ and B($B^0 \to D^{*-}\pi^+$) = $(2.76 \pm 0.13)\times10^{-3}$.

$\Gamma(\eta_c\phi)/\Gamma_{total}$ — Γ_{65}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
5.01±0.53±0.68	[1] AAIJ	17U	LHCB	pp at 7, 8 TeV

[1] The last uncertainty includes the limited knowledge of the external branching fractions where the η_c is reconstructed in the $p\overline{p}$,$K^+K^-\pi^+\pi^-$, $\pi^+\pi^-\pi^+\pi^-$, and $K^+K^-K^+K^-$ decays and $\phi(1020) \to K^+K^-$.

$\Gamma(\eta_c\pi^+\pi^-)/\Gamma_{total}$ — Γ_{67}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.76±0.59±0.31	[1] AAIJ	17U	LHCB	pp at 7, 8 TeV

[1] The last uncertainty includes the limited knowledge of the external branching fractions where the η_c is reconstructed in the $p\overline{p}$,$K^+K^-\pi^+\pi^-$, $\pi^+\pi^-\pi^+\pi^-$, and $K^+K^-K^+K^-$ decays. The significance of the signal, including systematic uncertainties, is 4.6 standard deviations.

$\Gamma(J/\psi(1S)\phi)/\Gamma_{total}$ — Γ_{68}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.03 ±0.04 OUR FIT					
1.03 ±0.04 OUR AVERAGE					
1.021±0.032±0.022		[1] AAIJ	21Y	LHCB	pp at 7, 8, 13 TeV
1.25 ±0.07 ±0.23		[2] THORNE	13	BELL	$e^+e^- \to \Upsilon(5S)$
1.5 ±0.5 ±0.1		[3] ABE	96Q	CDF	$p\overline{p}$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.050±0.013±0.104		[4] AAIJ	13AN	LHCB	Repl. by AAIJ 21Y
<6	1	[5] AKERS	94J	OPAL	$e^+e^- \to Z$
seen	14	[6] ABE	93F	CDF	$p\overline{p}$ at 1.8 TeV
seen	1	[7] ACTON	92N	OPAL	Sup. by AKERS 94J

[1] AAIJ 21Y reports $[\Gamma(B_s^0 \to J/\psi(1S)\phi)/\Gamma_{total}] \times [B(\phi(1020) \to K^+K^-)] = (5.01 \pm 0.16 \pm 0.17)\times10^{-4}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S)\phi)/\Gamma_{total}] \times [B(\phi(1020) \to K^+K^-)]$ / $[B(B^+ \to J/\psi(1S)K^+)]$ assuming $B(B^+ \to J/\psi(1S)K^+) = (1.003 \pm 0.035)\times10^{-3}$, which we rescale to our best values $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5)\times10^{-2}$, $B(B^+ \to J/\psi(1S)K^+) = (1.020 \pm 0.019)\times10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] THORNE 13 uses $f_s = (17.2 \pm 3.0)\%$ as the fraction of $\Upsilon(5S)$ decaying to $B_s^{(*)}\overline{B}_s^{(*)}$.

[3] ABE 96Q reports $[\Gamma(B_s^0 \to J/\psi(1S)\phi)/\Gamma_{total}] \times [\Gamma(\overline{b} \to B_s^0)/\left[\Gamma(\overline{b} \to B^+) + \Gamma(\overline{b} \to B^0)\right]] = (0.185 \pm 0.055 \pm 0.020)\times10^{-3}$ which we divide by our best value $\Gamma(\overline{b} \to B_s^0)/\left[\Gamma(\overline{b} \to B^+) + \Gamma(\overline{b} \to B^0)\right] = 0.1230 \pm 0.0115$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] AAIJ 13AN uses $f_s/f_d = 0.256 \pm 0.020$ and $B(B^+ \to J/\psi K^+) = (10.18 \pm 0.42)\times10^{-4}$.

[5] AKERS 94J sees one event and measures the limit on the product branching fraction $f(\overline{b} \rightarrow B_s^0) \cdot B(B_s^0 \rightarrow J/\psi(1S)\phi) < 7 \times 10^{-4}$ at CL = 90%. We divide by $B(\overline{b} \rightarrow B_s^0) = 0.112$.

[6] ABE 93F measured using $J/\psi(1S) \rightarrow \mu^+\mu^-$ and $\phi \rightarrow K^+K^-$.

[7] In ACTON 92N a limit on the product branching fraction is measured to be $f(\overline{b} \rightarrow B_s^0) \cdot B(B_s^0 \rightarrow J/\psi(1S)\phi) \leq 0.22 \times 10^{-2}$.

$\Gamma(J/\psi(1S)\phi\phi)/\Gamma(J/\psi(1S)\phi)$ — Γ_{69}/Γ_{68}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
$1.15 \pm 0.12^{+0.05}_{-0.09}$	128	[1] AAIJ	16U	LHCB	pp at 7, 8 TeV

[1] Uses $J/\psi \rightarrow \mu^+\mu^-$, $\phi \rightarrow K^+K^-$ decays, and observes 128 ± 13 events of $B_s^0 \rightarrow J/\psi\phi\phi$.

$\Gamma(J/\psi(1S)\pi^0)/\Gamma_{total}$ — Γ_{70}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.21 \times 10^{-5}$	90	[1] KUMAR	24	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.2 \times 10^{-3}$	90	[2] ACCIARRI	97C	L3	

[1] KUMAR 24 uses $f_s = (22.0^{+2.0}_{-2.1})$% as the fraction of $\Upsilon(5S)$ decaying to $B_s^{(*)}\overline{B}_s^{(*)}$.

[2] ACCIARRI 97C assumes B^0 production fraction (39.5 ± 4.0%) and B_s (12.0 ± 3.0%).

$\Gamma(J/\psi(1S)\eta)/\Gamma_{total}$ — Γ_{71}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
4.0 ±0.7 OUR AVERAGE		Error includes scale factor of 1.4.			
$3.6\ ^{+0.5}_{-0.6}\ ^{+0.3}_{-0.2}$		[1] AAIJ	13A	LHCB	pp at 7 TeV
$5.10 \pm 0.50^{+1.17}_{-0.83}$		[2] LI	12	BELL	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<38	90	[3] ACCIARRI	97C	L3	

[1] AAIJ 13A reports $[\Gamma(B_s^0 \rightarrow J/\psi(1S)\eta)/\Gamma_{total}] / [B(B^0 \rightarrow J/\psi(1S)\rho^0)] = 14.0 \pm 1.2^{+1.1}_{-1.5}{}^{+1.1}_{-1.0}$ which we multiply by our best value $B(B^0 \rightarrow J/\psi(1S)\rho^0) = (2.55^{+0.18}_{-0.16}) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Observed for the first time with significances over 10 σ. The second error are total systematic uncertainties including the error on $N(B_s^{(*)}\overline{B}_s^{(*)})$.

[3] ACCIARRI 97C assumes B^0 production fraction (39.5 ± 4.0%) and B_s (12.0 ± 3.0%).

$\Gamma(J/\psi(1S)K_S^0)/\Gamma_{total}$ — Γ_{72}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.92±0.14 OUR AVERAGE				
$1.92 \pm 0.14 \pm 0.05$	[1] AAIJ	15AL	LHCB	pp at 7, 8 TeV
$2.0 \pm 0.4 \pm 0.2$	[2] AALTONEN	11A	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.03 \pm 0.16 \pm 0.20$	[3] AAIJ	13AB	LHCB	Repl. by AAIJ 15AL
$2.03 \pm 0.26 \pm 0.20$	[4] AAIJ	12O	LHCB	Repl. by AAIJ 13AB

[1] AAIJ 15AL reports $[\Gamma(B_s^0 \to J/\psi(1S) K_S^0)/\Gamma_{total}] / [B(B^0 \to J/\psi(1S) K_S^0)] = (4.31 \pm 0.17 \pm 0.12 \pm 0.25) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to J/\psi(1S) K_S^0) = (4.45 \pm 0.11) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] AALTONEN 11A reports $[\Gamma(B_s^0 \to J/\psi(1S) K_S^0)/\Gamma_{total}] \times [B(\overline{b} \to B_s^0)] / [B(\overline{b} \to B^0)] / [B(B^0 \to J/\psi(1S) K_S^0)] = (1.09 \pm 0.19 \pm 0.11) \times 10^{-2}$ which we multiply or divide by our best values $B(\overline{b} \to B_s^0) = (10.0 \pm 0.8) \times 10^{-2}$, $B(\overline{b} \to B^0) = (40.8 \pm 0.7) \times 10^{-2}$, $B(B^0 \to J/\psi(1S) K_S^0) = 1/2 \times B(B^0 \to J/\psi(1S) K^0) = 1/2 \times (8.91 \pm 0.21) \times 10^{-4}$. Our firs t error is their experiment's error and our second error is the systematic error from using our best values.

[3] AAIJ 13AB reports $(1.97 \pm 0.14 \pm 0.07 \pm 0.15 \pm 0.08) \times 10^{-5}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S) K_S^0)/\Gamma_{total}] / [B(B^0 \to J/\psi(1S) K^0)] \times [\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0)]$ assuming $B(B^0 \to J/\psi(1S) K^0) = (8.98 \pm 0.35) \times 10^{-4}$,$\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0) = 0.256 \pm 0.020$, which we rescale to our best values $B(B^0 \to J/\psi(1S) K^0) = (8.91 \pm 0.21) \times 10^{-4}$, $\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[4] AAIJ 12O reports $(1.83 \pm 0.21 \pm 0.10 \pm 0.14 \pm 0.07) \times 10^{-5}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S) K_S^0)/\Gamma_{total}] / [B(B^0 \to J/\psi(1S) K^0)] \times [\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0)]$ assuming $B(B^0 \to J/\psi(1S) K^0) = (8.71 \pm 0.32) \times 10^{-4}$,$\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0) = 0.267^{+0.021}_{-0.02}$, which we rescale to our best values $B(B^0 \to J/\psi(1S) K^0) = (8.91 \pm 0.21) \times 10^{-4}$, $\Gamma(\overline{b} \to B_s^0)/\Gamma(\overline{b} \to B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(J/\psi(1S)\overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{73}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
4.14±0.18±0.35	[1] AAIJ	15AV	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$4.4\ ^{+0.5}_{-0.4}\ \pm 0.8$	[2] AAIJ	12AP	LHCB	Repl. by AAIJ 15AV
$9\ \pm 4\ \pm 1$	[3] AALTONEN	11A	CDF	$p\overline{p}$ at 1.96 TeV

[1] AAIJ 15AV result combines two measurements with different normalizing modes of $B^0 \to J/\psi K^*(892)^0$ and $B_s^0 \to J/\psi \phi$.

[2] AAIJ 12AP reports $B(B_s^0 \to J/\psi(1S) \overline{K}^*(892)^0)/B(B^0 \to J/\psi(1S) K^*(892)^0) = (3.43^{+0.34}_{-0.36} \pm 0.50) \times 10^{-2}$ and $B(B^0 \to J/\psi(1S) K^*(892)^0) = (1.29 \pm 0.05 \pm 0.13) \times 10^{-3}$ after correcting for the contribution from $K\pi$ S-wave beneath the K^* peak.

[3] AALTONEN 11A reports $[\Gamma(B_s^0 \to J/\psi(1S) \overline{K}^*(892)^0)/\Gamma_{total}] \times [B(\overline{b} \to B_s^0)] / [B(\overline{b} \to B^0)] / [B(B^0 \to J/\psi(1S) K^*(892)^0)] = 0.0168 \pm 0.0024 \pm 0.0068$ which we multiply or divide by our best values $B(\overline{b} \to B_s^0) = (10.0 \pm 0.8) \times 10^{-2}$, $B(\overline{b} \to B^0) = (40.8 \pm 0.7) \times 10^{-2}$, $B(B^0 \to J/\psi(1S) K^*(892)^0) = (1.27 \pm 0.05) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(J/\psi(1S)\eta')/\Gamma_{total}$ Γ_{74}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.3 ±0.4 OUR AVERAGE				
$3.2\ ^{+0.4}_{-0.5}\ \pm0.2$	[1] AAIJ	13A	LHCB	pp at 7 TeV
$3.71\pm0.61\ ^{+0.85}_{-0.60}$	[2] LI	12	BELL	$e^+e^- \to \Upsilon(4S)$

[1] AAIJ 13A reports $[\Gamma(B^0_s \to J/\psi(1S)\eta')/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)\rho^0)]$ = $12.7 \pm 1.1\,^{+0.5}_{-1.3}\,^{+1.0}_{-0.9}$ which we multiply by our best value $B(B^0 \to J/\psi(1S)\rho^0) = (2.55^{+0.18}_{-0.16}) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Observed for the first time with significances over 10 σ. The second error are total systematic uncertainties including the error on $N(B_s^{(*)}\overline{B}_s^{(*)})$.

$\Gamma(J/\psi(1S)\eta')/\Gamma(J/\psi(1S)\eta)$ Γ_{74}/Γ_{71}

VALUE	DOCUMENT ID		TECN	COMMENT
0.87 ±0.06 OUR AVERAGE				
$0.902\pm0.072\pm0.045$	[1] AAIJ	15D	LHCB	pp at 7, 8 TeV
$0.90\ \pm0.09\ ^{+0.06}_{-0.02}$	[2] AAIJ	13A	LHCB	pp at 7 TeV
$0.73\ \pm0.14\ \pm0.02$	[2] LI	12	BELL	$e^+e^- \to \Upsilon(4S)$

[1] Uses $J/\psi \to \mu^+\mu^-$, $\eta' \to \rho^0\gamma$, and $\eta' \to \eta\pi^+\pi^-$ decays.

[2] Strongly correlated with measurements of $\Gamma(J/\psi(1S)\eta)/\Gamma$ and $\Gamma(J/\psi(1S)\eta')/\Gamma$ reported in the same reference.

$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ Γ_{75}/Γ_{68}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
19.7±1.5 OUR FIT Error includes scale factor of 2.2.				
20.2±0.7±0.2	[1] AAIJ	12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(19.79 \pm 0.47 \pm 0.52) \times 10^{-2}$ from a measurement of $[\Gamma(B^0_s \to J/\psi(1S)\pi^+\pi^-)/\Gamma(B^0_s \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(J/\psi(1S)f_0(500),\ f_0 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)$ Γ_{76}/Γ_{78}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.034	90	[1] AAIJ	14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma(J/\psi(1S)\rho,\ \rho \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{77}/Γ_{75}

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.017	90	[1] AAIJ	14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

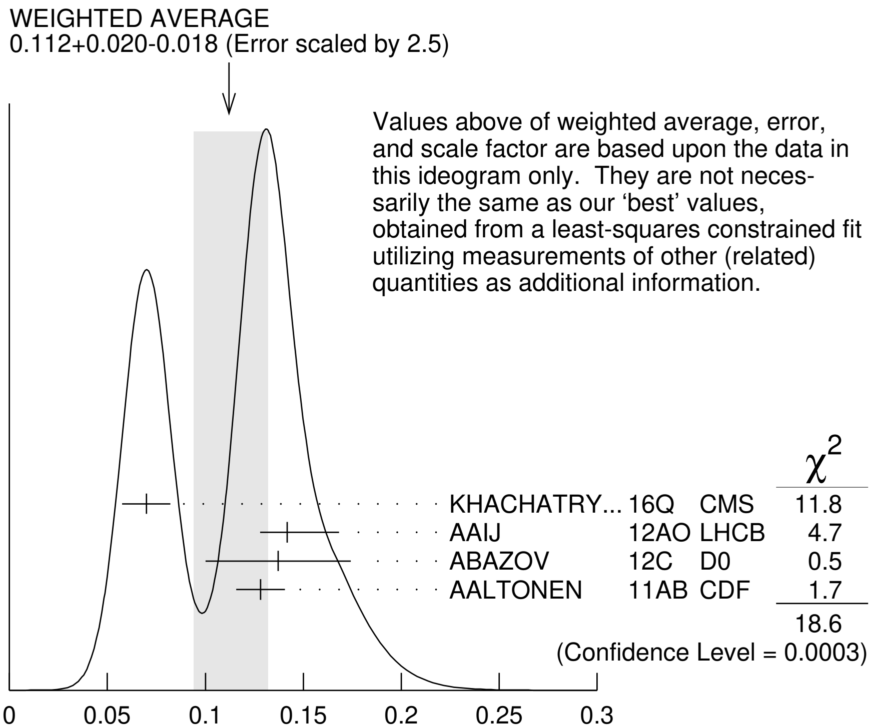
$\Gamma(J/\psi(1S)f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma_{total}$ Γ_{78}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.24±0.15 OUR FIT Error includes scale factor of 2.1.				
$\mathbf{1.16^{+0.31}_{-0.19}{}^{+0.30}_{-0.25}}$	[1] LI	11	BELL	$e^+e^- \to \Upsilon(5S)$

[1] The second error includes both the detector systematic and the uncertainty in the number of produced $Y(5S) \rightarrow B_s^{(*)} \overline{B}_s^{(*)}$ pairs.

$\Gamma(J/\psi(1S) f_0(980),\ f_0 \rightarrow \pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ $\qquad$ Γ_{78}/Γ_{68}

VALUE	DOCUMENT ID	TECN	COMMENT
$0.120^{+0.013}_{-0.015}$ OUR FIT Error includes scale factor of 2.4.			
$0.112^{+0.020}_{-0.018}$ OUR AVERAGE Error includes scale factor of 2.5. See the ideogram below.			
$0.070 \pm 0.012 \pm 0.001$	[1] KHACHATRY...16Q	CMS	pp at 7 TeV
$0.142^{+0.026}_{-0.014} \pm 0.002$	[2,3] AAIJ 12AO	LHCB	pp at 7 TeV
$0.137 \pm 0.037 \pm 0.001$	[4] ABAZOV 12C	D0	$p\overline{p}$ at 1.96 TeV
$0.128 \pm 0.012 \pm 0.001$	[5] AALTONEN 11AB	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.126^{+0.027}_{-0.023} \pm 0.001$	[6] AAIJ 11	LHCB	Repl. by AAIJ 12AO



$\Gamma\Big(J/\psi(1S) f_0(980),\ f_0 \rightarrow \pi^+\pi^-\Big)/\Gamma\Big(J/\psi(1S)\phi\Big)$

[1] KHACHATRYAN 16Q reports $[\Gamma(B_s^0 \rightarrow J/\psi(1S) f_0(980),\ f_0 \rightarrow \pi^+\pi^-)/\Gamma(B_s^0 \rightarrow J/\psi(1S)\phi)]$ / $[B(\phi(1020) \rightarrow K^+K^-)] = 0.140 \pm 0.008 \pm 0.023$ which we multiply by our best value $B(\phi(1020) \rightarrow K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] AAIJ 12AO reports $(13.9 \pm 0.6^{+2.5}_{-1.2}) \times 10^{-2}$ from a measurement of $[\Gamma(B_s^0 \rightarrow J/\psi(1S) f_0(980),\ f_0 \rightarrow \pi^+\pi^-)/\Gamma(B_s^0 \rightarrow J/\psi(1S)\phi)]$ / $[B(\phi(1020) \rightarrow K^+K^-)]$

assuming B($\phi(1020) \to K^+ K^-$) = $(48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best value B($\phi(1020) \to K^+ K^-$) = $(49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Measured in Dalitz plot like analysis of $B_s \to J/\psi \pi^+ \pi^-$ decays.

[4] ABAZOV 12C reports [$\Gamma(B_s^0 \to J/\psi(1S) f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)$] / [B($\phi(1020) \to K^+ K^-$)] = $0.275 \pm 0.041 \pm 0.061$ which we multiply by our best value B($\phi(1020) \to K^+ K^-$) = $(49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[5] AALTONEN 11AB reports [$\Gamma(B_s^0 \to J/\psi(1S) f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)$] / [B($\phi(1020) \to K^+ K^-$)] = $0.257 \pm 0.020 \pm 0.014$ which we multiply by our best value B($\phi(1020) \to K^+ K^-$) = $(49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[6] AAIJ 11 reports [$\Gamma(B_s^0 \to J/\psi(1S) f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)$] / [B($\phi(1020) \to K^+ K^-$)] = $0.252^{+0.046}_{-0.032}{}^{+0.027}_{-0.033}$ which we multiply by our best value B($\phi(1020) \to K^+ K^-$) = $(49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(J/\psi(1S) f_0(980),\ f_0 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{78}/Γ_{75}

VALUE	DOCUMENT ID	TECN	COMMENT
$0.61^{+0.06}_{-0.07}$ OUR FIT Error includes scale factor of 2.1.			
$0.703 \pm 0.015^{+0.004}_{-0.051}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma(J/\psi(1S) f_2(1270),\ f_2 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\phi)$ Γ_{79}/Γ_{68}

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
$10.0^{+3.4}_{-3.7} \pm 0.1$	[1,2] AAIJ 12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(0.098 \pm 0.033^{+0.006}_{-0.015}) \times 10^{-2}$ from a measurement of [$\Gamma(B_s^0 \to J/\psi(1S) f_2(1270),\ f_2 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)$] / [B($\phi(1020) \to K^+ K^-$)] assuming B($\phi(1020) \to K^+ K^-$) = $(48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best value B($\phi(1020) \to K^+ K^-$) = $(49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi \pi^+ \pi^-$ decays for the f_2 helicity state $\lambda = 0$.

$\Gamma(J/\psi(1S) f_2(1270)_0,\ f_2 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{80}/Γ_{75}

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$0.36 \pm 0.07 \pm 0.03$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma(J/\psi(1S) f_2(1270)_{\parallel},\ f_2 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ Γ_{81}/Γ_{75}

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$0.52 \pm 0.15^{+0.05}_{-0.02}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma\big(J/\psi(1S) f_2(1270)_\perp,\ f_2 \to \pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ Γ_{82}/Γ_{75}

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.63 \pm 0.34^{+0.16}_{-0.08}}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma\big(J/\psi(1S) f_0(1370),\ f_0 \to \pi^+\pi^-\big)/\Gamma_{\text{total}}$ Γ_{83}/Γ

VALUE (units 10^{-4})	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.34^{+0.11}_{-0.14}{}^{+0.085}_{-0.054}$	[1] LI 11	BELL	$e^+e^- \to \Upsilon(5S)$

[1] The second error includes both the detector systematic and the uncertainty in the number of produced $Y(5S) \to B_s^{(*)}\overline{B}_s^{(*)}$ pairs.

$\Gamma\big(J/\psi(1S) f_0(1370),\ f_0 \to \pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\phi\big)$ Γ_{83}/Γ_{68}

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
$\mathbf{4.27^{+0.55}_{-3.81} \pm 0.05}$	[1,2] AAIJ 12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(4.19 \pm 0.53^{+0.12}_{-3.7}) \times 10^{-2}$ from a measurement of $[\Gamma(B_s^0 \to J/\psi(1S) f_0(1370),\ f_0 \to \pi^+\pi^-)/\Gamma(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi\pi^+\pi^-$ decays.

$\Gamma\big(J/\psi(1S) f_0(1500),\ f_0 \to \pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ Γ_{84}/Γ_{75}

VALUE	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.101 \pm 0.008^{+0.011}_{-0.003}}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma\big(J/\psi(1S) f_2'(1525)_0,\ f_2' \to \pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ Γ_{85}/Γ_{75}

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.51 \pm 0.09^{+0.05}_{-0.04}}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma\big(J/\psi(1S) f_2'(1525)_\parallel,\ f_2' \to \pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ Γ_{86}/Γ_{75}

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.06^{+0.13}_{-0.04} \pm 0.01}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma\big(J/\psi(1S) f_2'(1525)_\perp,\ f_2' \to \pi^+\pi^-\big)/\Gamma\big(J/\psi(1S)\pi^+\pi^-\big)$ Γ_{87}/Γ_{75}

VALUE (%)	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.26 \pm 0.18^{+0.06}_{-0.04}}$	[1] AAIJ 14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma(J/\psi(1S) f_0(1790),\ f_0 \to \pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ — Γ_{88}/Γ_{75}

VALUE	DOCUMENT ID		TECN	COMMENT
$0.024 \pm 0.004^{+0.050}_{-0.002}$	[1] AAIJ	14BR	LHCB	pp at 7, 8 TeV

[1] Reported first of two solutions using the full Dalitz analysis.

$\Gamma(J/\psi(1S)\pi^+\pi^-\text{(nonresonant)})/\Gamma(J/\psi(1S)\phi)$ — Γ_{89}/Γ_{68}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$1.69^{+1.03}_{-0.33} \pm 0.02$	[1,2] AAIJ	12AO	LHCB	pp at 7 TeV

[1] AAIJ 12AO reports $(1.66 \pm 0.31^{+0.96}_{-0.08}) \times 10^{-2}$ from a measurement of $[\Gamma(B^0_s \to J/\psi(1S)\pi^+\pi^-\text{(nonresonant)})/\Gamma(B^0_s \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ assuming $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Measured in Dalitz plot like analysis of $B_s \to J/\psi\pi^+\pi^-$ decays.

$\Gamma(J/\psi(1S)\overline{K}^0\pi^+\pi^-)/\Gamma_{total}$ — Γ_{90}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.4 \times 10^{-5}$	90	[1] AAIJ	14L	LHCB	pp at 7 TeV

[1] Measured with $B(B^0_s \to J/\psi K^0_S\pi^+\pi^-)$ / $B(B^0 \to J/\psi K^0_S\pi^+\pi^-)$ using PDG 12 values for the involved branching fractions.

$\Gamma(J/\psi(1S)K^+K^-)/\Gamma_{total}$ — Γ_{91}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
7.9 ±0.7 OUR AVERAGE				
$7.70 \pm 0.08 \pm 0.72$	[1] AAIJ	13AN	LHCB	pp at 7 TeV
$10.1 \pm 0.9 \pm 2.1$	[2] THORNE	13	BELL	$e^+e^- \to \Upsilon(5S)$

[1] Uses $f_s/f_d = 0.256 \pm 0.020$ and $B(B^+ \to J/\psi K^+) = (10.18 \pm 0.42) \times 10^{-4}$.

[2] Uses $f_s = (17.2 \pm 3.0)\%$ as the fraction of $\Upsilon(5S)$ decaying to $B^{(*)}_s \overline{B}^{(*)}_s$.

$\Gamma(J/\psi(1S)K^0K^-\pi^+ + \text{c.c.})/\Gamma_{total}$ — Γ_{92}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$9.5 \pm 1.0 \pm 0.8$	[1] AAIJ	14L	LHCB	pp at 7 TeV

[1] AAIJ 14L reports $[\Gamma(B^0_s \to J/\psi(1S)K^0K^-\pi^+ + \text{c.c.})/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)K^0\pi^+\pi^-)] = 2.12 \pm 0.15 \pm 0.18$ which we multiply by our best value $B(B^0 \to J/\psi(1S)K^0\pi^+\pi^-) = (4.5 \pm 0.4) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. This is an observation of $B^0_s \to J/\psi K^0_S K^\pm\pi^\mp$ with more than 10 standard deviations.

$\Gamma(J/\psi(1S)\overline{K}^0K^+K^-)/\Gamma_{total}$ — Γ_{93}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<12 \times 10^{-6}$	90	[1] AAIJ	14L	LHCB	pp at 7 TeV

[1] Measured with $B(B^0_s \to J/\psi K^0_S K^+K^-)/B(B^0 \to J/\psi K^0_S\pi^+\pi^-)$ using PDG 12 values for the involved branching fractions.

$\Gamma(J/\psi(1S) f_2'(1525))/\Gamma_{total}$ — Γ_{95}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
$2.61 \pm 0.20^{+0.56}_{-0.50}$	[1] AAIJ	13AN	LHCB	pp at 7 TeV

[1] Uses $f_s/f_d = 0.256 \pm 0.020$ and $B(B^+ \to J/\psi K^+) = (10.18 \pm 0.42) \times 10^{-4}$.

$\Gamma(J/\psi(1S) f_2'(1525))/\Gamma(J/\psi(1S)\phi)$ — Γ_{95}/Γ_{68}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
21 ±4 OUR AVERAGE				
21.5±4.9±2.6	[1] THORNE	13	BELL	$e^+e^- \to \Upsilon(5S)$
21 ±7 ±1	[2,3] ABAZOV	12AF	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
27 ±4 ±1	[4] AAIJ	12S	LHCB	Repl. by AAIJ 13AN

[1] Uses $B(f_2'(1525) \to K^+K^-) = (44.4 \pm 1.1)\%$.

[2] ABAZOV 12AF reports $[\Gamma(B_s^0 \to J/\psi(1S) f_2'(1525))/\Gamma(B_s^0 \to J/\psi(1S)\phi)] \times B(f_2'(1525) \to K^+K^-) / B(\phi(1020) \to K^+K^-) = 0.19 \pm 0.05 \pm 0.04$ which we divide and multiply by our best values $B(f_2'(1525) \to K^+K^-) = \frac{1}{2}(88.8 \pm 2.2) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[3] ABAZOV 12AF fits the invariant masses of the K^+K^- pair in the range $1.35 < M(K^+K^-) < 2$ GeV.

[4] AAIJ 12S reports $[(26.4 \pm 2.7 \pm 2.4) \times 10^{-2}$ from a measurement of $\Gamma(B_s^0 \to J/\psi(1S) f_2'(1525))/\Gamma(B_s^0 \to J/\psi(1S)\phi)] \times B(f_2'(1525) \to K^+K^-) / B(\phi(1020) \to K^+K^-)$ assuming $B(f_2'(1525) \to K^+K^-) = (44.4 \pm 1.1) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (48.9 \pm 0.5) \times 10^{-2}$, which we rescale to our best values $B(f_2'(1525) \to K^+K^-) = \frac{1}{2}(88.8 \pm 2.2) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(J/\psi(1S) p\overline{p})/\Gamma_{total}$ — Γ_{96}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
3.58±0.19±0.39		[1] AAIJ	19U	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.8	90	[2] AAIJ	13Z	LHCB	Repl. by AAIJ 19U

[1] Measured relative to $B_s^0 \to J/\psi\phi$ assuming $B(B_s^0 \to J/\psi\phi) = (10.5 \pm 0.13 \pm 0.64) \times 10^{-4}$ and taking into account small K^+K^- S-wave contribution.

[2] Uses $B(B_s^0 \to J/\psi(1S)\pi^+\pi^-) = (1.98 \pm 0.20) \times 10^{-4}$.

$\Gamma(J/\psi(1S)\gamma)/\Gamma_{total}$ — Γ_{97}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.3 \times 10^{-6}$	90	[1] AAIJ	15BB	LHCB	pp at 7, 8 TeV

[1] Branching fractions of normalization modes $B_s^0 \to J/\psi\gamma X$ taken from PDG 14. Uses $f_s/f_d = 0.259 \pm 0.015$.

$\Gamma(J/\psi\mu^+\mu^-,\ J/\psi \to \mu^+\mu^-)/\Gamma_{total}$ — Γ_{98}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.6 \times 10^{-9}$	95	AAIJ	22Q	LHCB	pp at 7, 8, 13 TeV

$\Gamma(J/\psi(1S)\pi^+\pi^-\pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ — Γ_{99}/Γ_{75}

VALUE	DOCUMENT ID		TECN	COMMENT
0.371±0.015±0.022	[1] AAIJ	14Y	LHCB	pp at 7,8 TeV

[1] Excludes contributions from $\psi(2S)$ and $\chi_{c1}(3872)$ decaying to $J/\psi(1S)\pi^+\pi^-$.

$\Gamma(J/\psi(1S)f_1(1285))/\Gamma_{total}$ — Γ_{100}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
7.2±1.3±0.4	[1] AAIJ	14Y	LHCB	pp at 7, 8 TeV

[1] AAIJ 14Y reports $(7.14 \pm 0.99^{+0.83}_{-0.91} \pm 0.41) \times 10^{-5}$ from a measurement of $[\Gamma(B^0_s \rightarrow J/\psi(1S)f_1(1285))/\Gamma_{total}] \times [B(f_1(1285) \rightarrow 2\pi^+2\pi^-)]$ assuming $B(f_1(1285) \rightarrow 2\pi^+2\pi^-) = 0.11^{+0.007}_{-0.006}$, which we rescale to our best value $B(f_1(1285) \rightarrow 2\pi^+2\pi^-) = (10.9 \pm 0.6) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(J/\psi(1S)\overline{D}^0)/\Gamma_{total}$ — Γ_{101}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.0 \times 10^{-6}$	90	AAIJ	24F	LHCB	pp at 7, 8, 13 TeV

$\Gamma(\psi(2S)\eta)/\Gamma(J/\psi(1S)\eta)$ — Γ_{102}/Γ_{71}

VALUE	DOCUMENT ID		TECN	COMMENT
0.83±0.14±0.12	[1] AAIJ	13AA	LHCB	pp at 7 TeV

[1] Assuming lepton universality for dimuon decay modes of J/ψ and $\psi(2S)$ mesons, the ratio $B(J/\psi \rightarrow \mu^+\mu^-)/B(\psi(2S) \rightarrow \mu^+\mu^-) = B(J/\psi \rightarrow e^+e^-)/B(\psi(2S) \rightarrow e^+e^-) = 7.69 \pm 0.19$ was used.

$\Gamma(\psi(2S)\eta')/\Gamma(J/\psi(1S)\eta')$ — Γ_{103}/Γ_{74}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
38.7±9.0±1.6	[1] AAIJ	15D	LHCB	pp at 7, 8 TeV

[1] Uses $J/\psi \rightarrow \mu^+\mu^-$, $\eta' \rightarrow \rho^0\gamma$, and $\eta' \rightarrow \eta\pi^+\pi^-$ decays.

$\Gamma(\psi(2S)\pi^+\pi^-)/\Gamma(J/\psi(1S)\pi^+\pi^-)$ — Γ_{104}/Γ_{75}

VALUE	DOCUMENT ID		TECN	COMMENT
0.34±0.04±0.03	[1] AAIJ	13AA	LHCB	pp at 7 TeV

[1] Assuming lepton universality for dimuon decay modes of J/ψ and $\psi(2S)$ mesons, the ratio $B(J/\psi \rightarrow \mu^+\mu^-)/B(\psi(2S) \rightarrow \mu^+\mu^-) = B(J/\psi \rightarrow e^+e^-)/B(\psi(2S) \rightarrow e^+e^-) = 7.69 \pm 0.19$ was used.

$\Gamma(\psi(2S)\phi)/\Gamma_{total}$ — Γ_{105}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	1	BUSKULIC	93G	ALEP	$e^+e^- \rightarrow Z$

$\Gamma(\psi(2S)\phi)/\Gamma(J/\psi(1S)\phi)$ — Γ_{105}/Γ_{68}

VALUE	DOCUMENT ID		TECN	COMMENT
0.503±0.035 OUR AVERAGE				
0.500±0.034±0.014	[1,2] AAIJ	12L	LHCB	pp at 7 TeV
0.53 ±0.10 ±0.09	ABAZOV	09Y	D0	$p\overline{p}$ at 1.96 TeV

$0.52 \pm 0.13 \pm 0.07$	ABULENCIA	06N	CDF	$p\overline{p}$ at 1.96 TeV

[1] AAIJ 12L reports $0.489 \pm 0.026 \pm 0.021 \pm 0.012$ from a measurement of $[\Gamma(B^0_s \to \psi(2S)\phi)/\Gamma(B^0_s \to J/\psi(1S)\phi)] \times [B(J/\psi(1S) \to e^+e^-)] / [B(\psi(2S) \to e^+e^-)]$ assuming $B(J/\psi(1S) \to e^+e^-) = (5.94 \pm 0.06) \times 10^{-2}$,$B(\psi(2S) \to e^+e^-) = (7.72 \pm 0.17) \times 10^{-3}$, which we rescale to our best values $B(J/\psi(1S) \to e^+e^-) = (5.971 \pm 0.032) \times 10^{-2}$, $B(\psi(2S) \to e^+e^-) = (7.94 \pm 0.22) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] Assumes $B(J/\psi \to \mu^+\mu^-) / B(\psi(2S) \to \mu^+\mu^-) = B(J/\psi \to e^+e^-) / B(\psi(2S) \to e^+e^-) = 7.69 \pm 0.19$.

$\Gamma(\psi(2S)K^0)/\Gamma_{total}$ — Γ_{106}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$1.9 \pm 0.5 \pm 0.2$	[1] TUMASYAN	22AI	CMS	pp at 13 TeV

[1] TUMASYAN 22AI reports $[\Gamma(B^0_s \to \psi(2S)K^0)/\Gamma_{total}] / [B(B^0 \to \psi(2S)K^0)] = (3.33 \pm 0.69 \pm 0.11 \pm 0.34) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to \psi(2S)K^0) = (5.8 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\psi(2S)K^-\pi^+)/\Gamma_{total}$ — Γ_{107}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$3.12 \pm 0.30 \pm 0.21$	[1] AAIJ	15U	LHCB	pp at 7, 8 TeV

[1] AAIJ 15U reports $[\Gamma(B^0_s \to \psi(2S)K^-\pi^+)/\Gamma_{total}] / [B(B^0 \to \psi(2S)K^+\pi^-)] = (5.38 \pm 0.36 \pm 0.22 \pm 0.31) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to \psi(2S)K^+\pi^-) = (5.8 \pm 0.4) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\psi(2S)\overline{K}^*(892)^0)/\Gamma_{total}$ — Γ_{108}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
$3.3 \pm 0.5^{+0.2}_{-0.3}$	[1] AAIJ	15U	LHCB	pp at 7, 8 TeV

[1] AAIJ 15U reports $[\Gamma(B^0_s \to \psi(2S)\overline{K}^*(892)^0)/\Gamma_{total}] / [B(B^0 \to \psi(2S)K^*(892)^0)] = (5.58 \pm 0.57 \pm 0.40 \pm 0.32) \times 10^{-2}$ which we multiply by our best value $B(B^0 \to \psi(2S)K^*(892)^0) = (5.9 \pm 0.4) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\chi_{c1}\phi)/\Gamma(J/\psi(1S)\phi)$ — Γ_{109}/Γ_{68}

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$18.9 \pm 1.8 \pm 1.5$	[1] AAIJ	13AC	LHCB	pp at 7 TeV

[1] Uses $B(\chi_{c1} \to J/\psi\gamma) = (34.4 \pm 1.5)\%$.

$\Gamma(\chi_{c2}K^+K^-)/\Gamma(\chi_{c1}K^+K^-)$ — $\Gamma_{111}/\Gamma_{110}$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
$17.1 \pm 3.1 \pm 1.0$	[1] AAIJ	18AC	LHCB	pp at 7, 8, 13 TeV

[1] Measures the ratio for ± 15 MeV window around ϕ mass.

$\Gamma(\chi_{c1}(3872)\phi)/\Gamma(\psi(2S)\phi)$ $\Gamma_{112}/\Gamma_{105}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.19±0.06 OUR AVERAGE				
0.19±0.02±0.06	[1] AAIJ	21C	LHCB	pp at 7, 8, 13 TeV
0.18±0.03±0.06	[2] SIRUNYAN	20BB	CMS	pp at 13 TeV

[1] AAIJ 21C reports $[\Gamma(B^0_s \to \chi_{c1}(3872)\phi)/\Gamma(B^0_s \to \psi(2S)\phi)] \times [B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S))] / [B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)] = (2.42 \pm 0.23 \pm 0.07) \times 10^{-2}$ which we multiply or divide by our best values $B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S)) = (4.3 \pm 1.4) \times 10^{-2}$, $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (34.69 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] SIRUNYAN 20BB reports $[\Gamma(B^0_s \to \chi_{c1}(3872)\phi)/\Gamma(B^0_s \to \psi(2S)\phi)] \times [B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S))] / [B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)] = (2.21 \pm 0.29 \pm 0.17) \times 10^{-2}$ which we multiply or divide by our best values $B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S)) = (4.3 \pm 1.4) \times 10^{-2}$, $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (34.69 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(\chi_{c1}(3872)\pi^+\pi^-)/\Gamma(\psi(2S)\pi^+\pi^-)$ $\Gamma_{114}/\Gamma_{104}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.54±0.09±0.17	[1] AAIJ	23AP	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 23AP reports $[\Gamma(B^0_s \to \chi_{c1}(3872)\pi^+\pi^-)/\Gamma(B^0_s \to \psi(2S)\pi^+\pi^-)] \times [B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S))] / [B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-)] = (6.8 \pm 1.1 \pm 0.2) \times 10^{-2}$ which we multiply or divide by our best values $B(\chi_{c1}(3872) \to \pi^+\pi^- J/\psi(1S)) = (4.3 \pm 1.4) \times 10^{-2}$, $B(\psi(2S) \to J/\psi(1S)\pi^+\pi^-) = (34.69 \pm 0.34) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(J/\psi K^*(892)^0 \overline{K}^*(892)^0)/\Gamma(\psi(2S)\phi)$ Γ_{94}/Γ_{105}

VALUE	DOCUMENT ID		TECN	COMMENT
0.209±0.006±0.003	[1] AAIJ	21C	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 21C reports $\Gamma(B^0_s \to J/\psi K^*(892)^0 \overline{K}^*(892)^0)/\Gamma(B^0_s \to \psi(2S)\phi)$ $B^2(K^{*0} \to K^+\pi^-)/B(\psi(2S) \to J/\psi\pi^+\pi^-)/B(\phi \to K^+K^-) = 1.22 \pm 0.03 \pm 0.04$ which we adjust with PDG 20 values of $B(K^{*0} \to K^+\pi^-) = (99.902 \pm 0.009) \times 10^{-2}$, $B(\psi(2S) \to J/\psi\pi^+\pi^-) = (34.68 \pm 0.30) \times 10^{-2}$, and $B(\phi \to K^+K^-) = (49.2 \pm 0.5) \times 10^{-2}$. The first uncertainty is the total experiment's one and the second is due to the adjustment branching fractions.

$\Gamma(\chi_{c1}(3872)(K^+K^-)_{non-\phi})/\Gamma(\chi_{c1}(3872)\phi)$ $\Gamma_{113}/\Gamma_{112}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.78±0.17±0.01	[1] AAIJ	21C	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 21C reports $[\Gamma(B^0_s \to \chi_{c1}(3872)(K^+K^-)_{non-\phi})/\Gamma(B^0_s \to \chi_{c1}(3872)\phi)] / [B(\phi(1020) \to K^+K^-)] = 1.57 \pm 0.32 \pm 0.12$ which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\pi^+\pi^-)/\Gamma_{total}$ Γ_{115}/Γ

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
7.2±1.0 OUR AVERAGE					
$7.5\pm0.9\pm0.7$		[1] AAIJ	17G	LHCB	pp at 7 and 8 TeV
$6.5\pm1.8\pm0.6$		[2] AALTONEN	12L	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$10.9^{+2.6}_{-2.2}\pm1.1$		[3] AAIJ	12AR	LHCB	Repl. by AAIJ 17G
<120	90	[4] PENG	10	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
<12	90	[5] AALTONEN	09C	CDF	Repl. by AALTONEN 12L
<17	90	[6] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 09C
<2320	90	[7] ABE	00C	SLD	$e^+e^- \rightarrow Z$
<1700	90	[8] BUSKULIC	96V	ALEP	$e^+e^- \rightarrow Z$

[1] AAIJ 17G reports $[\Gamma(B^0_s \rightarrow \pi^+\pi^-)/\Gamma_{total}] / [B(B^0 \rightarrow K^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0)] = (9.15 \pm 0.71 \pm 0.83) \times 10^{-3}$ which we multiply or divide by our best values $B(B^0 \rightarrow K^+\pi^-) = (2.00 \pm 0.04) \times 10^{-5}$, $\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] AALTONEN 12L reports $[\Gamma(B^0_s \rightarrow \pi^+\pi^-)/\Gamma_{total}] / [B(B^0 \rightarrow K^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0)] = 0.008 \pm 0.002 \pm 0.001$ which we multiply or divide by our best values $B(B^0 \rightarrow K^+\pi^-) = (2.00 \pm 0.04) \times 10^{-5}$, $\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[3] AAIJ 12AR reports $[\Gamma(B^0_s \rightarrow \pi^+\pi^-)/\Gamma_{total}] / [B(B^0 \rightarrow \pi^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0)] = 0.050^{+0.011}_{-0.009} \pm 0.004$ which we multiply or divide by our best values $B(B^0 \rightarrow \pi^+\pi^-) = (5.37 \pm 0.20) \times 10^{-6}$, $\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[4] Uses $\Upsilon(10860) \rightarrow B^*_s \overline{B}^*_s$ and assumes $B(\Upsilon(10860) \rightarrow B^{(*)}_s \overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \rightarrow B^*_s \overline{B}^*_s) / \Gamma(\Upsilon(10860) \rightarrow B^{(*)}_s \overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$.

[5] Obtains this result from $(f_s/f_d) \cdot B(B_s \rightarrow \pi^+\pi^-)/B(B^0 \rightarrow K^+\pi^-) = 0.007 \pm 0.004 \pm 0.005$, assuming $f_s/f_d = 0.276 \pm 0.034$ and $B(B^0 \rightarrow K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$.

[6] ABULENCIA,A 06D obtains this from $B(B_s \rightarrow \pi^+\pi^-) / B(B_s \rightarrow K^+K^-) < 0.05$ at 90% CL, assuming $B(B_s \rightarrow K^+K^-) = (33 \pm 6 \pm 7) \times 10^{-6}$.

[7] ABE 00C assumes $B(Z \rightarrow b\overline{b})=(21.7 \pm 0.1)\%$ and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$.

[8] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

$\Gamma(\pi^0\pi^0)/\Gamma_{total}$ Γ_{116}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$\mathbf{<7.7\times10^{-6}}$	90	[1] BORAH	23	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.1\times10^{-4}$	90	[2] ACCIARRI	95H	L3	$e^+e^- \rightarrow Z$

[1] BORAH 23 assumes $f_{B_s} = 20.1 \pm 3.1\%$.

[2] ACCIARRI 95H assumes $f_{B^0} = 39.5 \pm 4.0$ and $f_{B_s} = 12.0 \pm 3.0\%$.

$\Gamma(\eta\pi^0)/\Gamma_{\text{total}}$ — Γ_{117}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.0 \times 10^{-3}$	90	[1] ACCIARRI	95H	L3	$e^+e^- \to Z$

[1] ACCIARRI 95H assumes $f_{B^0} = 39.5 \pm 4.0$ and $f_{B_s} = 12.0 \pm 3.0\%$.

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$ — Γ_{118}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.43 \times 10^{-4}$	90	BHUYAN	22	BELL	$e^+e^- \to \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.5 \times 10^{-3}$	90	[1] ACCIARRI	95H	L3	$e^+e^- \to Z$

[1] ACCIARRI 95H assumes $f_{B^0} = 39.5 \pm 4.0$ and $f_{B_s} = 12.0 \pm 3.0\%$.

$\Gamma(\rho^0\rho^0)/\Gamma_{\text{total}}$ — Γ_{119}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<3.20 \times 10^{-4}$	90	[1] ABE	00C	SLD	$e^+e^- \to Z$

[1] ABE 00C assumes B($Z \to b\overline{b}$)=(21.7 $\pm$ 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(\eta' K^0_S)/\Gamma_{\text{total}}$ — Γ_{120}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.16 \times 10^{-6}$	90	[1] PANG	22	BELL	$e^+e^- \to \Upsilon(5S)$

[1] Uses $\Upsilon(10860) \to B_s^{(*)}\overline{B}_s^{(*)}$ decays and assumes B($\Upsilon(10860) \to B_s^{(*)}\overline{B}_s^{(*)}$) = (20.1 $\pm$ 3.1)%.

$\Gamma(\eta'\eta)/\Gamma_{\text{total}}$ — Γ_{121}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.5 \times 10^{-5}$	90	[1] NISAR	21	BELL	$e^+e^- \to \Upsilon(5S)$

[1] Uses $\Upsilon(10860) \to B_s^*\overline{B}_s^*$ decays and assumes B($\Upsilon(10860) \to B_s^{(*)}\overline{B}_s^{(*)}$) = (20.1 $\pm$ 3.1)%.

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$ — Γ_{122}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
3.3±0.7±0.1	[1] AAIJ	15O	LHCB	pp at 7, 8 TeV

[1] AAIJ 15O reports [$\Gamma(B_s^0 \to \eta'\eta')/\Gamma_{\text{total}}$] / [B($B^+ \to \eta' K^+$)] = 0.47 $\pm$ 0.09 $\pm$ 0.04 which we multiply by our best value B($B^+ \to \eta' K^+$) = (7.04 $\pm$ 0.25) $\times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\eta'\phi)/\Gamma_{\text{total}}$ — Γ_{123}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<0.82 \times 10^{-6}$	90	[1] AAIJ	17BA	LHCB	pp at 7, 8 TeV

[1] Corresponds to the 95% CL upper limit 1.01 $\times 10^{-6}$. Uses the normalization mode $B^+ \to \eta' K^+$ with branching fraction $(70.6 \pm 2.5) \times 10^{-6}$ and the ratio of hadronisation fractions f_s/f_d =0.259 $\pm$ 0.015, which is assumed equal to f_s/f_u.

$\Gamma(\eta' X_{s\bar{s}})/\Gamma_{total}$ — Γ_{66}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
<1.4	90	[1] DUBEY	21	BELL	$e^+e^- \to \Upsilon(4S)$

[1] DUBEY 21 result is for $m(X_{s\bar{s}}) < 2.85$ GeV/c^2.

$\Gamma(\phi f_0(980),\ f_0(980) \to \pi^+\pi^-)/\Gamma_{total}$ — Γ_{124}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
1.12±0.16±0.14	[1] AAIJ	17A	LHCB	pp at 7, 8 TeV

[1] Signal is observed with 8 standard deviations significance.

$\Gamma(\phi f_2(1270),\ f_2(1270) \to \pi^+\pi^-)/\Gamma_{total}$ — Γ_{125}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.61 \pm 0.13^{+0.13}_{-0.08}}$	[1] AAIJ	17A	LHCB	pp at 7, 8 TeV

[1] Signal is observed with 5 standard deviations significance.

$\Gamma(\phi\rho^0)/\Gamma_{total}$ — Γ_{126}/Γ

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
2.7±0.7±0.3		[1] AAIJ	17A	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6170	90	[2] ABE	00C	SLD	$e^+e^- \to Z$

[1] Signal evidence is 4 standard deviations.
[2] ABE 00C assumes B($Z \to b\bar{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(\phi\pi^+\pi^-)/\Gamma_{total}$ — Γ_{127}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
3.48±0.23±0.39	[1] AAIJ	17A	LHCB	pp at 7, 8 TeV

[1] Inclusive decays in mass range $400 < m(\pi^+\pi^-) < 1600$ MeV/c^2.

$\Gamma(\phi\phi)/\Gamma_{total}$ — Γ_{128}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
18.4±1.4 OUR FIT					
18.5±1.4±1.0		[1] AAIJ	15AS	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$14\ ^{+6}_{-5}\ \pm 6$		[2] ACOSTA	05J	CDF	Repl. by AALTONEN 11AN
<1183	90	[3] ABE	00C	SLD	$e^+e^- \to Z$

[1] AAIJ 15AS reports $[\Gamma(B^0_s \to \phi\phi)/\Gamma_{total}]$ / $[B(B^0 \to K^*(892)^0\phi)] = 1.84 \pm 0.05 \pm 0.13$ which we multiply by our best value $B(B^0 \to K^*(892)^0\phi) = (1.00 \pm 0.05) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.
[2] Uses $B(B^0 \to J/\psi\phi) = (1.38 \pm 0.49) \times 10^{-3}$ and production cross-section ratio of $\sigma(B_s)/\sigma(B^0) = 0.26 \pm 0.04$.
[3] ABE 00C assumes B($Z \to b\bar{b}$)=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(\phi\phi)/\Gamma(J/\psi(1S)\phi)$ Γ_{128}/Γ_{68}

VALUE (units 10^{-2})	DOCUMENT ID	TECN	COMMENT
1.79±0.14 OUR FIT			
1.78±0.14±0.20	AALTONEN 11AN	CDF	$p\overline{p}$ at 1.96 TeV

$\Gamma(\phi\phi\phi)/\Gamma(\phi\phi)$ $\Gamma_{129}/\Gamma_{128}$

VALUE	DOCUMENT ID	TECN	COMMENT
0.117±0.030±0.015	AAIJ 17BB	LHCB	pp at 7, 8 TeV

$\Gamma(\pi^+ K^-)/\Gamma_{total}$ Γ_{130}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT
5.9±0.7 OUR AVERAGE				
6.0±0.7±0.6		[1] AAIJ 12AR	LHCB	pp at 7 TeV
5.8±1.0±0.5		[2] AALTONEN 09C	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<26	90	[3] PENG 10	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
<5.6	90	[4] ABULENCIA,A 06D	CDF	Repl. by AALTONEN 09C
<261	90	[5] ABE 00C	SLD	$e^+e^- \rightarrow Z$
<210	90	[6] BUSKULIC 96V	ALEP	$e^+e^- \rightarrow Z$
<260	90	[7] AKERS 94L	OPAL	$e^+e^- \rightarrow Z$

[1] AAIJ 12AR reports $[\Gamma(B_s^0 \rightarrow \pi^+ K^-)/\Gamma_{total}]$ / $[B(B^0 \rightarrow K^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B_s^0)/\Gamma(\overline{b} \rightarrow B^0)] = 0.074 \pm 0.006 \pm 0.006$ which we multiply or divide by our best values $B(B^0 \rightarrow K^+\pi^-) = (2.00 \pm 0.04) \times 10^{-5}$, $\Gamma(\overline{b} \rightarrow B_s^0)/\Gamma(\overline{b} \rightarrow B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] AALTONEN 09C reports $[\Gamma(B_s^0 \rightarrow \pi^+ K^-)/\Gamma_{total}]$ / $[B(B^0 \rightarrow K^+\pi^-)] \times [B(\overline{b} \rightarrow B_s^0)]$ / $[B(\overline{b} \rightarrow B^0)] = 0.071 \pm 0.010 \pm 0.007$ which we multiply or divide by our best values $B(B^0 \rightarrow K^+\pi^-) = (2.00 \pm 0.04) \times 10^{-5}$, $B(\overline{b} \rightarrow B_s^0) = (10.0 \pm 0.8) \times 10^{-2}$, $B(\overline{b} \rightarrow B^0) = (40.8 \pm 0.7) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[3] Uses $\Upsilon(10860) \rightarrow B_s^* \overline{B}_s^*$ and assumes $B(\Upsilon(10860) \rightarrow B_s^{(*)} \overline{B}_s^{(*)}) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \rightarrow B_s^* \overline{B}_s^*)$ / $\Gamma(\Upsilon(10860) \rightarrow B_s^{(*)} \overline{B}_s^{(*)}) = (90.1^{+3.8}_{-4.0})\%$.

[4] ABULENCIA,A 06D obtains this from (f_s/f_d) $(B(B_s \rightarrow \pi^+ K^-)$ / $B(B^0 \rightarrow K^+\pi^-))$ < 0.08 at 90% CL, assuming $f_s/f_d = 0.260 \pm 0.039$ and $B(B^0 \rightarrow K^+\pi^-) = (18.9 \pm 0.7) \times 10^{-6}$.

[5] ABE 00C assumes $B(Z \rightarrow b\overline{b})=(21.7 \pm 0.1)\%$ and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})\%$ and $f_{B_s}=(10.5^{+1.8}_{-2.2})\%$.

[6] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

[7] Assumes $B(Z \rightarrow b\overline{b}) = 0.217$ and B_d^0 (B_s^0) fraction 39.5% (12%).

$\Gamma(K^+ K^-)/\Gamma_{total}$ Γ_{131}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID	TECN	COMMENT
27.2± 2.3 OUR AVERAGE				
25.7± 1.7±2.5		[1] AAIJ 12AR	LHCB	pp at 7 TeV
28.3± 2.4±2.7		[2] AALTONEN 11N	CDF	$p\overline{p}$ at 1.96 TeV
$38\ ^{+10}_{-\ 9}\ \pm 7$		[3] PENG 10	BELL	$e^+e^- \rightarrow \Upsilon(5S)$

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

<310	90	DRUTSKOY	07A	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
33 ± 6 ±7		[4] ABULENCIA,A	06D	CDF	Repl. by AALTONEN 11N
<283	90	[5] ABE	00C	SLD	$e^+e^- \rightarrow Z$
< 59	90	[6] BUSKULIC	96V	ALEP	$e^+e^- \rightarrow Z$
<140	90	[7] AKERS	94L	OPAL	$e^+e^- \rightarrow Z$

[1] AAIJ 12AR reports $[\Gamma(B^0_s \rightarrow K^+K^-)/\Gamma_{\rm total}]$ / $[B(B^0 \rightarrow K^+\pi^-)] \times [\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0)] = 0.316 \pm 0.009 \pm 0.019$ which we multiply or divide by our best values $B(B^0 \rightarrow K^+\pi^-) = (2.00 \pm 0.04) \times 10^{-5}$, $\Gamma(\overline{b} \rightarrow B^0_s)/\Gamma(\overline{b} \rightarrow B^0) = 0.246 \pm 0.023$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

[2] AALTONEN 11N reports (f_s/f_d) $(B(B^0_s \rightarrow K^+K^-)$ / $B(B^0 \rightarrow K^+\pi^-)) = 0.347 \pm 0.020 \pm 0.021$. We multiply this result by our best value of $B(B^0 \rightarrow K^+\pi^-) = (2.00 \pm 0.04) \times 10^{-5}$ and divide by our best value of f_s/f_d, where $1/2\ f_s/f_d = 0.1230 \pm 0.0115$. Our first quoted uncertainty is the combined experiment's uncertainty and our second is the systematic uncertainty from using out best values.

[3] Uses $\Upsilon(10860) \rightarrow B^*_s\overline{B}^*_s$ and assumes $B(\Upsilon(10860) \rightarrow B^{(*)}_s\overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \rightarrow B^*_s\overline{B}^*_s)$ / $\Gamma(\Upsilon(10860) \rightarrow B^{(*)}_s\overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$.

[4] ABULENCIA,A 06D obtains this from (f_s/f_d) $(B(B_s \rightarrow K^+K^-)$ / $B(B^0 \rightarrow K^+\pi^-))$ $= 0.46 \pm 0.08 \pm 0.07$, assuming $f_s/f_d = 0.260 \pm 0.039$ and $B(B^0 \rightarrow K^+\pi^-) = (18.9 \pm 0.7) \times 10^{-6}$.

[5] ABE 00C assumes $B(Z \rightarrow b\overline{b})$=(21.7 ± 0.1)% and the B fractions f_{B^0}=f_{B^+}=$(39.7^{+1.8}_{-2.2})\%$ and f_{B_s}=$(10.5^{+1.8}_{-2.2})\%$.

[6] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

[7] Assumes $B(Z \rightarrow b\overline{b}) = 0.217$ and B^0_d (B^0_s) fraction 39.5% (12%).

$\Gamma(K^0\overline{K}^0)/\Gamma_{\rm total}$ — Γ_{132}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
1.76±0.31 OUR AVERAGE					
$1.68 \pm 0.34^{+0.16}_{-0.15}$		[1] AAIJ	20F	LHCB	pp at 7, 8, 13 TeV
$1.96^{+0.58}_{-0.51} \pm 0.10 \pm 0.20$		[2] PAL	16	BELL	$e^+e^- \rightarrow \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6.6	90	[3] PENG	10	BELL	Repl. by PAL 16

[1] AAIJ 20F reports $[\Gamma(B^0_s \rightarrow K^0\overline{K}^0)/\Gamma_{\rm total}]$ / $[B(B^0 \rightarrow K^0\phi)] = 2.3 \pm 0.4 \pm 0.2 \pm 0.1$ which we multiply by our best value $B(B^0 \rightarrow K^0\phi) = (7.3 \pm 0.7) \times 10^{-6}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Observed in $B^0_s \rightarrow K^0_S K^0_S$ with significance of 5.1 σ. The last uncertainty is due to the uncertainty of the total number of $B^0_s\overline{B}^0_s$ pairs.

[3] Uses $\Upsilon(10860) \rightarrow B^*_s\overline{B}^*_s$ and assumes $B(\Upsilon(10860) \rightarrow B^{(*)}_s\overline{B}^{(*)}_s) = (19.3 \pm 2.9)\%$ and $\Gamma(\Upsilon(10860) \rightarrow B^*_s\overline{B}^*_s)$ / $\Gamma(\Upsilon(10860) \rightarrow B^{(*)}_s\overline{B}^{(*)}_s) = (90.1^{+3.8}_{-4.0})\%$.

$\Gamma(K^0\pi^+\pi^-)/\Gamma_{\rm total}$ — Γ_{133}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
9.5±2.1±0.3	[1,2] AAIJ	17BP	LHCB	pp at 7, 8 TeV

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

14 ±4 ±1	[3] AAIJ	13BP	LHCB	Repl. by AAIJ 17BP

[1] AAIJ 17BP reports $[\Gamma(B_s^0 \to K^0\pi^+\pi^-)/\Gamma_{total}] / [B(B^0 \to K^0\pi^+\pi^-)] = 0.191 \pm 0.027 \pm 0.033$ which we multiply by our best value $B(B^0 \to K^0\pi^+\pi^-) = (4.97 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Used $f_s/f_d = 0.259 \pm 0.015$.

[3] AAIJ 13BP reports $[\Gamma(B_s^0 \to K^0\pi^+\pi^-)/\Gamma_{total}] / [B(B^0 \to K^0\pi^+\pi^-)] = 0.29 \pm 0.06 \pm 0.04$ which we multiply by our best value $B(B^0 \to K^0\pi^+\pi^-) = (4.97 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^0 K^\pm \pi^\mp)/\Gamma_{total}$ — Γ_{134}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
8.4±0.8±0.3	[1,2] AAIJ	17BP	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
7.4±0.9±0.3	[3] AAIJ	13BP	LHCB	Repl. by AAIJ 17BP

[1] AAIJ 17BP reports $[\Gamma(B_s^0 \to K^0 K^\pm \pi^\mp)/\Gamma_{total}] / [B(B^0 \to K^0\pi^+\pi^-)] = 1.70 \pm 0.07 \pm 0.15$ which we multiply by our best value $B(B^0 \to K^0\pi^+\pi^-) = (4.97 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Used $f_s/f_d = 0.259 \pm 0.015$.

[3] AAIJ 13BP reports $[\Gamma(B_s^0 \to K^0 K^\pm \pi^\mp)/\Gamma_{total}] / [B(B^0 \to K^0\pi^+\pi^-)] = 1.48 \pm 0.12 \pm 0.14$ which we multiply by our best value $B(B^0 \to K^0\pi^+\pi^-) = (4.97 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(K^*(892)^- \pi^+)/\Gamma_{total}$ — Γ_{135}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
2.9±1.0±0.2	[1,2] AAIJ	14BM	LHCB	pp at 7 TeV

[1] AAIJ 14BM reports $[\Gamma(B_s^0 \to K^*(892)^-\pi^+)/\Gamma_{total}] / [B(B^0 \to K^*(892)^+\pi^-)] = 0.39 \pm 0.13 \pm 0.05$ which we multiply by our best value $B(B^0 \to K^*(892)^+\pi^-) = (7.5 \pm 0.4) \times 10^{-6}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Uses $f_s/f_d = 0.259 \pm 0.015$.

$\Gamma(K^*(892)^\pm K^\mp)/\Gamma_{total}$ — Γ_{136}/Γ

VALUE (units 10^{-5})	DOCUMENT ID		TECN	COMMENT
1.86±0.12±0.45	[1,2] AAIJ	19K	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.12\pm0.21^{+0.07}_{-0.06}$	[3,4] AAIJ	14BM	LHCB	Repl. by AAIJ 19K

[1] AAIJ 19K reports $(18.6 \pm 1.2 \pm 0.8 \pm 4.0 \pm 2.0) \times 10^{-6}$ as the measured value. We have combined in quadrature all systematic uncertainties into a single one.

[2] Measured in Dalitz plot analysis of $B_s^0 \to K_S^0 K^\pm \pi^\mp$ decays.

[3] AAIJ 14BM reports $[\Gamma(B_s^0 \to K^*(892)^\pm K^\mp)/\Gamma_{total}] / [B(B^0 \to K^*(892)^+\pi^-)] = 1.49 \pm 0.22 \pm 0.18$ which we multiply by our best value $B(B^0 \to K^*(892)^+\pi^-) =$

$(7.5 \pm 0.4) \times 10^{-6}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[4] Uses $f_s/f_d = 0.259 \pm 0.015$.

$\Gamma(K_0^*(1430)^{\pm} K^{\mp})/\Gamma_{\text{total}}$ — Γ_{137}/Γ

VALUE (units 10^{-5})		DOCUMENT ID	TECN	COMMENT
3.13±0.23±2.53	[1,2]	AAIJ 19K	LHCB	pp at 7, 8 TeV

[1] AAIJ 19K reports $(31.3 \pm 2.3 \pm 0.7 \pm 25.1 \pm 3.3) \times 10^{-6}$ as the measured value. We have combined in quadrature all systematic uncertainties into a single one.

[2] Measured in Dalitz plot analysis of $B_s^0 \to K_S^0 K^{\pm} \pi^{\mp}$ decays.

$\Gamma(K_2^*(1430)^{\pm} K^{\mp})/\Gamma_{\text{total}}$ — Γ_{138}/Γ

VALUE (units 10^{-5})		DOCUMENT ID	TECN	COMMENT
1.03±0.25±1.64	[1,2]	AAIJ 19K	LHCB	pp at 7, 8 TeV

[1] AAIJ 19K reports $(10.3 \pm 2.5 \pm 1.1 \pm 16.3 \pm 1.1) \times 10^{-6}$ as the measured value. We have combined in quadrature all systematic uncertainties into a single one.

[2] Measured in Dalitz plot analysis of $B_s^0 \to K_S^0 K^{\pm} \pi^{\mp}$ decays.

$\Gamma(K^*(892)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{139}/Γ

VALUE (units 10^{-5})		DOCUMENT ID	TECN	COMMENT
1.98±0.28±0.50	[1,2]	AAIJ 19K	LHCB	pp at 7, 8 TeV

[1] AAIJ 19K reports $(19.8 \pm 2.8 \pm 1.2 \pm 4.4 \pm 2.1) \times 10^{-6}$ as the measured value. We have combined in quadrature all systematic uncertainties into a single one.

[2] Measured in Dalitz plot analysis of $B_s^0 \to K_S^0 K^{\pm} \pi^{\mp}$ decays.

$\Gamma(K_0^*(1430) \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{140}/Γ

VALUE (units 10^{-5})		DOCUMENT ID	TECN	COMMENT
3.30±0.25±0.98	[1,2]	AAIJ 19K	LHCB	pp at 7, 8 TeV

[1] AAIJ 19K reports $(33.0 \pm 2.5 \pm 0.9 \pm 9.1 \pm 3.5) \times 10^{-6}$ as the measured value. We have combined in quadrature all systematic uncertainties into a single one.

[2] Measured in Dalitz plot analysis of $B_s^0 \to K_S^0 K^{\pm} \pi^{\mp}$ decays.

$\Gamma(K_2^*(1430)^0 \overline{K}^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{141}/Γ

VALUE (units 10^{-5})		DOCUMENT ID	TECN	COMMENT
1.68±0.45±2.13	[1,2]	AAIJ 19K	LHCB	pp at 7, 8 TeV

[1] AAIJ 19K reports $(16.8 \pm 4.5 \pm 1.7 \pm 21.2 \pm 1.8) \times 10^{-6}$ as the measured value. We have combined in quadrature all systematic uncertainties into a single one.

[2] Measured in Dalitz plot analysis of $B_s^0 \to K_S^0 K^{\pm} \pi^{\mp}$ decays.

$\Gamma(K_S^0 \overline{K}^*(892)^0 + \text{c.c.})/\Gamma_{\text{total}}$ — Γ_{142}/Γ

VALUE (units 10^{-6})		DOCUMENT ID	TECN	COMMENT
16.4±3.4±2.3	[1]	AAIJ 16	LHCB	pp at 7 TeV

[1] Measured relative to $B^0 \to K_S^0 \pi^+ \pi^-$ using the value of $B(B^0 \to K^0 \pi^+ \pi^-) = (4.96 \pm 0.2) \times 10^{-5}$.

$\Gamma(K^0 K^+ K^-)/\Gamma_{\text{total}}$ — Γ_{143}/Γ

VALUE (units 10^{-7})	CL%		DOCUMENT ID	TECN	COMMENT
12.9±6.5±0.5		[1,2,3]	AAIJ 17BP	LHCB	pp at 7, 8 TeV

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

<34	90	[4] AAIJ	13BP	LHCB	Repl. by AAIJ 17BP

[1] AAIJ 17BP reports $[\Gamma(B_s^0 \to K^0 K^+ K^-)/\Gamma_{\rm total}] / [B(B^0 \to K^0 \pi^+ \pi^-)] = 0.026 \pm 0.011 \pm 0.007$ which we multiply by our best value $B(B^0 \to K^0 \pi^+ \pi^-) = (4.97 \pm 0.18) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] AAIJ 17BP also set the limit range 4–25 $\times 10^{-7}$ at 90% CL using the world average value $B(B^0 \to K^0 \pi^+ \pi^-) = (4.96 \pm 0.20) \times 10^{-5}$.

[3] Used $f_s/f_d = 0.259 \pm 0.015$.

[4] AAIJ 13BP reports $[\Gamma(B_s^0 \to K^0 K^+ K^-)/\Gamma_{\rm total}] / [B(B^0 \to K^0 \pi^+ \pi^-)] < 0.068$ which we multiply by our best value $B(B^0 \to K^0 \pi^+ \pi^-) = 4.97 \times 10^{-5}$.

$\Gamma(\overline{K}^*(892)^0 \rho^0)/\Gamma_{\rm total}$ Γ_{144}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7.67 \times 10^{-4}$	90	[1] ABE	00C	SLD	$e^+ e^- \to Z$

[1] ABE 00C assumes $B(Z \to b\overline{b})$=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(\overline{K}^*(892)^0 K^*(892)^0)/\Gamma_{\rm total}$ Γ_{145}/Γ

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
1.11±0.26±0.06		[1] AAIJ	15AF	LHCB	pp at 7 TeV

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

2.81±0.46±0.56		[2] AAIJ	12F	LHCB	Repl. by AAIJ 15AF
<168.1	90	[3] ABE	00C	SLD	$e^+ e^- \to Z$

[1] AAIJ 15AF reports $[\Gamma(B_s^0 \to \overline{K}^*(892)^0 K^*(892)^0)/\Gamma_{\rm total}] / [B(B^0 \to K^*(892)^0 \phi)] = 1.11 \pm 0.22 \pm 0.12 \pm 0.06$ which we multiply by our best value $B(B^0 \to K^*(892)^0 \phi) = (1.00 \pm 0.05) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] Uses $B^0 \to J/\psi K^{*0}$ for normalization and assumes $B(B^0 \to J/\psi K^{*0})$ $B(J/\psi \to \mu^+ \mu^-)$ $B(K^{*0} \to K^+ \pi^-) = (1.33 \pm 0.06) \times 10^{-3}$ and $f_s/f_d = 0.253 \pm 0.031$. The second quoted error is total uncertainty including the error of 0.34 on f_s/f_d.

[3] ABE 00C assumes $B(Z \to b\overline{b})$=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(\phi K^*(892)^0)/\Gamma_{\rm total}$ Γ_{149}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
1.14±0.29±0.06		[1] AAIJ	13BW	LHCB	pp at 7 TeV

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

<1013	90	[2] ABE	00C	SLD	$e^+ e^- \to Z$

[1] AAIJ 13BW reports $[\Gamma(B_s^0 \to \phi K^*(892)^0)/\Gamma_{\rm total}] / [B(B^0 \to K^*(892)^0 \phi)] = 0.113 \pm 0.024 \pm 0.016$ which we multiply by our best value $B(B^0 \to K^*(892)^0 \phi) = (1.00 \pm 0.05) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] ABE 00C assumes $B(Z \to b\overline{b})$=(21.7 ± 0.1)% and the B fractions $f_{B^0}=f_{B^+}=(39.7^{+1.8}_{-2.2})$% and $f_{B_s}=(10.5^{+1.8}_{-2.2})$%.

$\Gamma(p\overline{p})/\Gamma_{total}$ — Γ_{150}/Γ

Test for ΔB=1 weak neutral current. Allowed by higher-order electroweak interactions.

VALUE (units 10^{-8})	CL%	DOCUMENT ID		TECN	COMMENT
< 0.44	90	[1] AAIJ	23T	LHCB	pp at 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 1.5	90	[2] AAIJ	17BJ	LHCB	Repl. by AAIJ 23T
$2.84^{+2.03}_{-1.68}{}^{+0.85}_{-0.18}$		[3] AAIJ	13BQ	LHCB	Repl. by AAIJ 17BJ
<5900	90	[4] BUSKULIC	96V	ALEP	$e^+e^- \to Z$

[1] Uses normalization mode B($B^0 \to K^+\pi^-$) = (19.6 ± 0.5) × 10^{-6} and B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.2539 ± 0.0079.

[2] Uses normalization mode B($B^0 \to K^+\pi^-$) = (19.6 ± 0.5) × 10^{-6} and B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.259 ± 0.015.

[3] Uses normalization mode B($B^0 \to K^+\pi^-$) = (19.55 ± 0.54) × 10^{-6} and B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.256 ± 0.020.

[4] BUSKULIC 96V assumes PDG 96 production fractions for B^0, B^+, B_s, b baryons.

$\Gamma(p\overline{p}K^+K^-)/\Gamma_{total}$ — Γ_{151}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
4.5±0.4±0.2	[1,2] AAIJ	17BD	LHCB	pp at 7, 8 TeV

[1] AAIJ 17BD reports [$\Gamma(B^0_s \to p\overline{p}K^+K^-)/\Gamma_{total}$] / [B($B^0 \to J/\psi(1S)K^*(892)^0$)] / [B($J/\psi(1S) \to p\overline{p}$)] / [B($K^*(892) \to (K\pi)^\pm$)] = 1.67 ± 0.12 ± 0.11 which we multiply by our best values B($B^0 \to J/\psi(1S)K^*(892)^0$) = (1.27 ± 0.05) × 10^{-3}, B($J/\psi(1S) \to p\overline{p}$) = (2.120 ± 0.029) × 10^{-3}, B($K^*(892) \to (K\pi)^\pm$) = (99.902 ± 0.009) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best values. Reported value assumes f_s/f_d = 0.259 ± 0.015.

[2] The branching ratio is given for $m_{p\overline{p}}$ <2.85 GeV.

$\Gamma(p\overline{p}K^+\pi^-)/\Gamma_{total}$ — Γ_{152}/Γ

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
13.9±2.5±0.5	[1,2] AAIJ	17BD	LHCB	pp at 7, 8 TeV

[1] AAIJ 17BD reports [$\Gamma(B^0_s \to p\overline{p}K^+\pi^-)/\Gamma_{total}$] / [B($B^0 \to J/\psi(1S)K^*(892)^0$)] / [B($J/\psi(1S) \to p\overline{p}$)] / [B($K^*(892) \to (K\pi)^\pm$)] = 0.52 ± 0.08 ± 0.05 which we multiply by our best values B($B^0 \to J/\psi(1S)K^*(892)^0$) = (1.27 ± 0.05) × 10^{-3}, B($J/\psi(1S) \to p\overline{p}$) = (2.120 ± 0.029) × 10^{-3}, B($K^*(892) \to (K\pi)^\pm$) = (99.902 ± 0.009) × 10^{-2}. Our first error is their experiment's error and our second error is the systematic error from using our best values. Reported value assumes f_s/f_d = 0.259 ± 0.015.

[2] The branching ratio is given for $m_{p\overline{p}}$ <2.85 GeV.

$\Gamma(p\overline{p}K^+\pi^-)/\Gamma(p\overline{p}K^+K^-)$ — $\Gamma_{152}/\Gamma_{151}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.31±0.05±0.02	[1,2] AAIJ	17BD	LHCB	pp at 7, 8 TeV

[1] Reports B($B^0_s \to p\overline{p}K^+\pi^-$) / B($B^0 \to p\overline{p}K^+\pi^-$) = 0.22 ± 0.04 ± 0.02 ± 0.01, where the third error is due to f_s/f_d.

[2] The ratio is given for $m_{p\overline{p}}$ <2.85 GeV and assuming f_s/f_d = 0.259 ± 0.015.

$\Gamma(p\overline{p}\pi^+\pi^-)/\Gamma_{\text{total}}$ Γ_{153}/Γ

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
4.3±2.0±0.2	[1,2] AAIJ	17BD	LHCB	pp at 7, 8 TeV

[1] AAIJ 17BD reports $[\Gamma(B_s^0 \to p\overline{p}\pi^+\pi^-)/\Gamma_{\text{total}}]$ / $[B(B^0 \to J/\psi(1S)K^*(892)^0)]$ / $[B(J/\psi(1S) \to p\overline{p})]$ / $[B(K^*(892) \to (K\pi)^\pm)] = 0.16 \pm 0.07 \pm 0.02$ which we multiply by our best values $B(B^0 \to J/\psi(1S)K^*(892)^0) = (1.27 \pm 0.05) \times 10^{-3}$, $B(J/\psi(1S) \to p\overline{p}) = (2.120 \pm 0.029) \times 10^{-3}$, $B(K^*(892) \to (K\pi)^\pm) = (99.902 \pm 0.009) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values. Reported value assumes $f_s/f_d = 0.259 \pm 0.015$.

[2] The branching ratio is given for $m_{p\overline{p}} <2.85$ GeV.

$\Gamma(p\overline{p}p\overline{p})/\Gamma_{\text{total}}$ Γ_{154}/Γ

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
2.3±1.0±0.1	[1] AAIJ	23AD	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 23AD reports $(2.3 \pm 1.0 \pm 0.2 \pm 0.1) \times 10^{-8}$ from a measurement of $[\Gamma(B_s^0 \to p\overline{p}p\overline{p})/\Gamma_{\text{total}}]$ / $[B(B_s^0 \to J/\psi(1S)\phi)]$ / $[B(\phi(1020) \to K^+K^-)]$ / $[B(J/\psi(1S) \to p\overline{p})]$ assuming $B(B_s^0 \to J/\psi(1S)\phi) = (1.04 \pm 0.04) \times 10^{-3}$,$B(\phi(1020) \to K^+K^-) = 0.491 \pm 0.005$,$B(J/\psi(1S) \to p\overline{p}) = (2.120 \pm 0.029) \times 10^{-3}$, which we rescale to our best values $B(B_s^0 \to J/\psi(1S)\phi) = (1.03 \pm 0.04) \times 10^{-3}$, $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$, $B(J/\psi(1S) \to p\overline{p}) = (2.120 \pm 0.029) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(p\overline{\Lambda}K^- + \text{c.c.})/\Gamma_{\text{total}}$ Γ_{155}/Γ

VALUE (units 10^{-6})	DOCUMENT ID		TECN	COMMENT
5.5±0.9±0.4	[1,2] AAIJ	17AL	LHCB	pp at 7, 8 TeV

[1] AAIJ 17AL reports $(5.46 \pm 0.61 \pm 0.82) \times 10^{-6}$ from a measurement of $[\Gamma(B_s^0 \to p\overline{\Lambda}K^- + \text{c.c.})/\Gamma_{\text{total}}]$ / $[B(B^0 \to p\overline{\Lambda}\pi^-)]$ assuming $B(B^0 \to p\overline{\Lambda}\pi^-) = (3.14 \pm 0.29) \times 10^{-6}$, which we rescale to our best value $B(B^0 \to p\overline{\Lambda}\pi^-) = (3.16 \pm 0.24) \times 10^{-6}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[2] AAIJ 17AL value represents the sum of $B_s^0 \to p\overline{\Lambda}K^-$ and $B_s^0 \to \overline{p}\Lambda K^+$ and assumes the fraction $f_s/f_d = 0.259 \pm 0.015$.

$\Gamma(\Lambda_c^-\Lambda\pi^+)/\Gamma_{\text{total}}$ Γ_{156}/Γ

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
3.6±1.1±1.2	[1] SOLOVIEVA	13	BELL	$e^+e^- \to \Upsilon(4S)$

[1] The second error is the total systematic uncertainty including the Λ_c absolute branching fractions and the normalizion number of B_s events.

$\Gamma(\Lambda_c^-\Lambda_c^+)/\Gamma_{\text{total}}$ Γ_{157}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8.0 × 10⁻⁵	95	[1] AAIJ	14AA	LHCB	pp at 7 TeV

[1] Uses $B(\overline{B}^0 \to D^+D_s^-) = (7.2 \pm 0.8) \times 10^{-3}$.

$\Gamma(\gamma\gamma)/\Gamma_{total}$ — Γ_{158}/Γ

Test for ΔB=1 weak neutral current.

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
< 3.1	90	[1] DUTTA	15	BELL	$e^+e^- \to \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
< 8.7	90	[2] WICHT	08A	BELL	Repl. by DUTTA 15
< 53	90	DRUTSKOY	07A	BELL	Repl. by WICHT 08A
<148	90	[3] ACCIARRI	95I	L3	$e^+e^- \to Z$

[1] Assumes the fraction of $B_s^{(*)}\overline{B}_s^{(*)}$ in $b\overline{b}$ events is $f_s = (17.2 \pm 3.0)\%$.

[2] Assumes $\Upsilon(5S) \to B_s^*\overline{B}_s^* = (19.5^{+3.0}_{-2.3})\%$.

[3] ACCIARRI 95I assumes $f_{B^0} = 39.5 \pm 4.0$ and $f_{B_s} = (12.0 \pm 3.0)\%$.

$\Gamma(\phi\gamma)/\Gamma_{total}$ — Γ_{159}/Γ

VALUE (units 10^{-6})	CL%	DOCUMENT ID		TECN	COMMENT
34 ± 4 OUR AVERAGE					
36 ± 5 ± 7		[1] DUTTA	15	BELL	$e^+e^- \to \Upsilon(5S)$
33.8 ± 3.4 ± 2.0		[2] AAIJ	13	LHCB	pp at 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
39 ± 5		[3] AAIJ	12AE	LHCB	Repl. by AAIJ 13
$57\ ^{+18}_{-15}\ ^{+12}_{-11}$		[4] WICHT	08A	BELL	Repl. by DUTTA 15
<390	90	DRUTSKOY	07A	BELL	$e^+e^- \to \Upsilon(5S)$
<120	90	ACOSTA	02G	CDF	$p\overline{p}$ at 1.8 TeV
<700	90	[5] ADAM	96D	DLPH	$e^+e^- \to Z$

[1] Assumes the fraction of $B_s^{(*)}\overline{B}_s^{(*)}$ in $b\overline{b}$ events is $f_s = (17.2 \pm 3.0)\%$. The systematic uncertainty from f_s is 0.6×10^{-5}.

[2] AAIJ 13 reports $[\Gamma(B_s^0 \to \phi\gamma)/\Gamma_{total}] / [B(B^0 \to K^*(892)^0\gamma)] = 0.81 \pm 0.04 \pm 0.07$ which we multiply by our best value $B(B^0 \to K^*(892)^0\gamma) = (4.18 \pm 0.25) \times 10^{-5}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

[3] Measures $B(B^0 \to K^{*0}\gamma)/B(B_s \to \phi\gamma) = 1.12 \pm 0.08(\text{stat})^{+0.06}_{-0.04}(\text{sys})^{+0.09}_{-0.08}(f_s/f_d)$ and uses current world-average value of $B(B^0 \to K^{*0}\gamma) = (4.33 \pm 0.15) \times 10^{-5}$.

[4] Assumes $\Upsilon(5S) \to B_s^*\overline{B}_s^* = (19.5^{+3.0}_{-2.3})\%$.

[5] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

$\Gamma(f_2(1270)\gamma)/\Gamma(\phi\gamma)$ — $\Gamma_{160}/\Gamma_{159}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{26^{+11}_{-13}{}^{+2}_{-3}}$	[1] AAIJ	24S	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 24S reports $[\Gamma(B_s^0 \to f_2(1270)\gamma)/\Gamma(B_s^0 \to \phi\gamma)] \times B(f_2(1270) \to K^+K^-) / B(\phi(1020) \to K^+K^-) = 1.2^{+0.4}_{-0.3}{}^{+0.3}_{-0.5}\%$ which we divide and multiply by our best values $B(f_2(1270) \to K^+K^-) = \frac{1}{2}(4.6 \pm 0.4) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(f'_2(1525)\gamma)/\Gamma(\phi\gamma)$ $\qquad\Gamma_{161}/\Gamma_{159}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{19.4^{+1.7}_{-1.0}\pm0.5}$	[1] AAIJ	24S	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 24S reports $[\Gamma(B^0_s \to f'_2(1525)\gamma)/\Gamma(B^0_s \to \phi\gamma)] \times B(f'_2(1525) \to K^+K^-) / B(\phi(1020) \to K^+K^-) = 17.3^{+0.8}_{-0.7}{}^{+1.3}_{-0.5}\%$ which we divide and multiply by our best values $B(f'_2(1525) \to K^+K^-) = \frac{1}{2}(88.8 \pm 2.2) \times 10^{-2}$, $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best values.

$\Gamma(\phi(1680)\gamma,\ \phi \to K^+K^-)/\Gamma(\phi\gamma)$ $\qquad\Gamma_{162}/\Gamma_{159}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{2.69^{+0.67}_{-0.63}\pm0.03}$	[1] AAIJ	24S	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 24S reports $[\Gamma(B^0_s \to \phi(1680)\gamma,\ \phi \to K^+K^-)/\Gamma(B^0_s \to \phi\gamma)] / [B(\phi(1020) \to K^+K^-)] = 5.4^{+0.9}_{-0.6}{}^{+1.0}_{-1.1}$ % which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\phi_3(1850)\gamma,\ \phi_3 \to K^+K^-)/\Gamma(\phi\gamma)$ $\qquad\Gamma_{163}/\Gamma_{159}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.200^{+0.180}_{-0.141}\pm0.002}$	[1] AAIJ	24S	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 24S reports $[\Gamma(B^0_s \to \phi_3(1850)\gamma,\ \phi_3 \to K^+K^-)/\Gamma(B^0_s \to \phi\gamma)] / [B(\phi(1020) \to K^+K^-)] = 0.4^{+0.3}_{-0.2}{}^{+0.2}_{-0.2}$ % which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(f_2(2010)\gamma,\ f_2 \to K^+K^-)/\Gamma(\phi\gamma)$ $\qquad\Gamma_{164}/\Gamma_{159}$

VALUE (%)	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.299^{+0.212}_{-0.141}\pm0.003}$	[1] AAIJ	24S	LHCB	pp at 7, 8, 13 TeV

[1] AAIJ 24S reports $[\Gamma(B^0_s \to f_2(2010)\gamma,\ f_2 \to K^+K^-)/\Gamma(B^0_s \to \phi\gamma)] / [B(\phi(1020) \to K^+K^-)] = 0.6^{+0.3}_{-0.2}{}^{+0.3}_{-0.2}$ % which we multiply by our best value $B(\phi(1020) \to K^+K^-) = (49.9 \pm 0.5) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\mu^+\mu^-)/\Gamma_{\text{total}}$ $\qquad\Gamma_{165}/\Gamma$

Test for $\Delta B = 1$ weak neutral current.

VALUE (units 10^{-9})	CL%	DOCUMENT ID		TECN	COMMENT
3.34±0.27 OUR AVERAGE					
$3.83^{+0.38}_{-0.36}{}^{+0.24}_{-0.21}$		[1] TUMASYAN	23A	CMS	pp at 13 TeV
$3.09^{+0.46}_{-0.43}{}^{+0.15}_{-0.11}$		AAIJ	22	LHCB	pp at 7, 8, 13 TeV
$2.9 \pm0.6 \pm0.4$		[2] SIRUNYAN	20AG	CMS	pp at 7, 8, 13 TeV
$2.8\ {}^{+0.8}_{-0.7}$		[3] AABOUD	19L	ATLS	pp at 7, 8, 13 TeV

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

$3.0 \pm 0.6\ ^{+0.3}_{-0.2}$			AAIJ	17AI	LHCB	Repl. by AAIJ 22
$0.9\ ^{+1.1}_{-0.8}$		[4]	AABOUD	16L	ATLS	Repl. by AABOUD 19L
$2.8\ ^{+0.7}_{-0.6}$		[5]	KHACHATRY...	15BE	LHC	pp at 7, 8 TeV
$3.2\ ^{+1.4}_{-1.2}\ ^{+0.5}_{-0.3}$		[6]	AAIJ	13B	LHCB	Repl. by AAIJ 13BA
$2.9\ ^{+1.1}_{-1.0}\ ^{+0.3}_{-0.1}$		[7]	AAIJ	13BA	LHCB	Repl. by KHACHATRYAN 15BE
$13\ ^{+9}_{-7}$		[8]	AALTONEN	13F	CDF	$p\overline{p}$ at 1.96 TeV
<12	90	[9]	ABAZOV	13C	D0	$p\overline{p}$ at 1.96 TeV
$3.0\ ^{+1.0}_{-0.9}$		[10]	CHATRCHYAN	13AW	CMS	Repl. by SIRUNYAN 20AG
<19	90	[11]	AAD	12AE	ATLS	pp at 7 TeV
<12	90	[12]	AAIJ	12A	LHCB	Repl. by AAIJ 12W
< 3.8	90	[13]	AAIJ	12W	LHCB	Repl. by AAIJ 13B
< 6.4	90	[14]	CHATRCHYAN	12A	CMS	pp at 7 TeV
<43	90	[15]	AAIJ	11B	LHCB	Repl. by AAIJ 12A
<35	90	[16]	AALTONEN	11AG	CDF	$p\overline{p}$ at 1.96 TeV
<16	90	[17]	CHATRCHYAN	11T	CMS	Repl. by CHATRCHYAN 12A
<42	90	[18]	ABAZOV	10S	D0	$p\overline{p}$ at 1.96 TeV

[1] Uses normalization mode B($B^+ \to J/\psi K^+$) = $(1.020 \pm 0.019) \times 10^{-3}$, B($J/\psi \to \mu^+\mu^-$) = $(5.961 \pm 0.033) \times 10^{-2}$ and B production ratio f($b \to B^0_s$)/f($b \to B^+$) = 0.231 ± 0.008.

[2] Uses normalization mode B($B^+ \to J/\psi K^+$) = $(1.01 \pm 0.03) \times 10^{-3}$ and B production ratio f($b \to B^0_s$)/f($b \to B^+$) = $0.252 \pm 0.012 \pm 0.015$.

[3] Uses normalization mode B($B^+ \to J/\psi K^+$) = $(1.010 \pm 0.029) \times 10^{-3}$ and B production ratio f($b \to B^0_s$)/f($b \to B^0$) = 0.256 ± 0.013.

[4] This value corresponds to an upper limit of $< 3.0 \times 10^{-9}$ at 95% C.L. It uses $f_s/f_d = 0.24 \pm 0.02$.

[5] Determined from the joint fit to CMS and LHCb data. Uncertainty includes both statistical and systematic component.

[6] Uses B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.256 ± 0.020 and two normalization modes: B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$ and B($B^0 \to K^+\pi^-$) = $(1.94 \pm 0.06) \times 10^{-5}$.

[7] Uses B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.259 ± 0.015 and normalization modes $B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$ and $B^0 \to K^+\pi^-$.

[8] Uses normalization mode B($B^+ \to J/\psi K^+$) = $(10.22 \pm 0.35) \times 10^{-4}$ and B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.28 ± 0.04.

[9] Uses normalization mode B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.01 \pm 0.21) \times 10^{-5}$ and B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.263 ± 0.017.

[10] Uses B production ratio f($\overline{b} \to B^0_s$)/f($\overline{b} \to B^0_d$) = 0.256 ± 0.020 and B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.0 \pm 0.2) \times 10^{-5}$ for normalization.

[11] Uses B production ratio f($\overline{b} \to B^+$)/f($\overline{b} \to B^0_s$) = 3.75 ± 0.29 and B($B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+$) = $(6.0 \pm 0.2) \times 10^{-5}$.

[12] Uses B production ratio $f(\overline{b} \to B^0_s)/f(\overline{b} \to B^0_d) = 0.267^{+0.021}_{-0.020}$ and three normalization modes $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$, $B(B^0 \to K^+\pi^-) = (1.94 \pm 0.06) \times 10^{-5}$, and $B(B^0_s \to J/\psi\phi \to \mu^+\mu^- K^+K^-) = (3.4 \pm 0.9) \times 10^{-5}$.

[13] Uses B production ratio $f(\overline{b} \to B^0_s)/f(\overline{b} \to B^0_d) = 0.267^{+0.021}_{-0.020}$ and three normalization modes of $B^+ \to J/\psi K^+$, $B^0 \to K^+\pi^-$, and $B^0_s \to J/\psi\phi$.

[14] Uses $f_s/f_u = 0.267 \pm 0.021$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.0 \pm 0.2) \times 10^{-5}$.

[15] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B^0_s) = 3.71 \pm 0.47$ and three normalization modes.

[16] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B^0_s) = 3.55 \pm 0.47$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.01 \pm 0.21) \times 10^{-5}$.

[17] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B^0_s) = 3.55 \pm 0.42$ and $B(B^+ \to J/\psi K^+ \to \mu^+\mu^- K^+) = (6.0 \pm 0.2) \times 10^{-5}$.

[18] Uses B production ratio $f(\overline{b} \to B^+)/f(\overline{b} \to B^0_s) = 3.86 \pm 0.59$, and the number of $B^+ \to J/\psi K^+$ decays.

$\Gamma(e^+e^-)/\Gamma_{total}$ — Γ_{166}/Γ

Test for $\Delta B = 1$ weak neutral current.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9.4 \times 10^{-9}$	90	[1] AAIJ	20W	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.8 \times 10^{-7}$	90	AALTONEN	09P	CDF	$p\overline{p}$ at 1.96 TeV
$<5.4 \times 10^{-5}$	90	[2] ACCIARRI	97B	L3	$e^+e^- \to Z$

[1] Assumes no contribution from $B^0 \to e^+e^-$ decays.

[2] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b.

$\Gamma(\tau^+\tau^-)/\Gamma_{total}$ — Γ_{167}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6.8 \times 10^{-3}$	95	[1] AAIJ	17AJ	LHCB	pp at 7, 8 TeV

[1] Assuming no contribution from $B^0 \to \tau^+\tau^-$.

$\Gamma(\mu^+\mu^-\gamma)/\Gamma_{total}$ — Γ_{168}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.2 \times 10^{-8}$	95	[1] AAIJ	24Q	LHCB	pp at 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.0 \times 10^{-9}$	95	[2,3] AAIJ	22	LHCB	pp at 7, 8, 13 TeV

[1] The exclusion limit is quoted at 95% CL for the dimuon mass region $[3.92 - m_{B^0_s}]$ GeV/c^2. The limits are also reported for other dimuon mass regions: $< 4.2 \times 10^{-8}$ in $[2m_\mu - 1.7]$ GeV/c^2; $< 7.7 \times 10^{-8}$ in [1.70–2.88] GeV/c^2; $< 2.8 \times 10^{-8}$ in $[2m_\mu - 1.7]$ GeV/c^2 and excluding ϕ mass.

[2] The exclusion is limited to the range $m_{\mu\mu} > 4.9$ GeV/c^2.

[3] For the mass region $4.9 - m_{B^0_s}$ GeV/c^2.

$\Gamma(\mu^+\mu^-\mu^+\mu^-)/\Gamma_{total}$ — Γ_{169}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<8.6 \times 10^{-10}$	95	AAIJ	22Q	LHCB	pp at 7, 8, 13 TeV

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

$<2.5 \times 10^{-9}$	95	AAIJ	17N	LHCB	pp at 7, 8 TeV
$<1.6 \times 10^{-8}$	95	[1] AAIJ	13AW	LHCB	Repl. by AAIJ 17N

[1] Also reports a limit of $< 1.2 \times 10^{-8}$ at 90% CL.

$\Gamma(\overline{D}^0 \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{176}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.2 \times 10^{-7}$	90	AAIJ	24F	LHCB	pp at 7, 8, 13 TeV

$\Gamma(SP,\ S \to \mu^+ \mu^-,\ P \to \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{170}/Γ

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.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.2 \times 10^{-9}$	95	AAIJ	17N	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.2 \times 10^{-8}$	90	[1] AAIJ	13AW	LHCB	Repl. by AAIJ 17N

[1] Also reports a limit of $< 1.6 \times 10^{-8}$ at 95% CL.

$\Gamma(aa,\ a \to \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{171}/Γ

Here particle a is a scalar with a mass of 1 GeV/c^2.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<5.8 \times 10^{-10}$	95	AAIJ	22Q	LHCB	pp at 7, 8, 13 TeV

$\Gamma(\phi(1020) \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{172}/Γ

Test for $\Delta B = 1$ weak neutral current.

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<32	90	[1] ABAZOV	06G	D0	$p\overline{p}$ at 1.96 TeV
$< 4.7 \times 10^2$	90	ACOSTA	02D	CDF	$p\overline{p}$ at 1.8 TeV

[1] Uses B($B_s^0 \to J/\psi \phi$) = 9.3×10^{-4}.

$\Gamma(\phi(1020) \mu^+ \mu^-)/\Gamma(J/\psi(1S) \phi)$ Γ_{172}/Γ_{68}

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
0.806±0.026 OUR AVERAGE					
$0.800 \pm 0.021 \pm 0.016$		AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV
$1.13 \pm 0.19 \pm 0.07$		AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.741^{+0.042}_{-0.040} \pm 0.029$		AAIJ	15AQ	LHCB	Repl. by AAIJ 21AG
$0.674^{+0.061}_{-0.056} \pm 0.016$		AAIJ	13X	LHCB	Repl. by AAIJ 15AQ
$1.11 \pm 0.25 \pm 0.09$		AALTONEN	11L	CDF	Repl. by AALTONEN 11AI
< 2.3	90	AALTONEN	09B	CDF	Repl. by AALTONEN 11L

$\Gamma(\overline{K}^*(892)^0 \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{174}/Γ

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
2.9±1.0±0.4	[1] AAIJ	18AB	LHCB	pp at 7, 8, 13 TeV

[1] Normalizes to B($B^0 \to J/\psi K^{*0}$) = $1.19 \pm 0.01 \pm 0.08$% and B($J/\psi \to \mu^+ \mu^-$) = 5.96 ± 0.03%, and uses $f_s/f_d = 0.259 \pm 0.015$.

$\Gamma(f_2'(1525)\mu^+\mu^-)/\Gamma(J/\psi(1S)\phi)$ Γ_{173}/Γ_{68}

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
1.55±0.19±0.08	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured by combining the q^2 regions [0.1, 0.98], [1.1, 8.0], and [11.0, 12.5] GeV^2/c^4.

$\Gamma(\pi^+\pi^-\mu^+\mu^-)/\Gamma_{total}$ Γ_{175}/Γ

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
8.4±1.6±0.3	[1] AAIJ	15S	LHCB	pp at 7, 8 TeV

[1] AAIJ 15S reports $(8.6 \pm 1.5 \pm 0.7 \pm 0.7) \times 10^{-8}$ from a measurement of $[\Gamma(B_s^0 \to \pi^+\pi^-\mu^+\mu^-)/\Gamma_{total}]$ / $[B(B^0 \to J/\psi(1S)K^*(892)^0)]$ assuming $B(B^0 \to J/\psi(1S)K^*(892)^0) = (1.3 \pm 0.1) \times 10^{-3}$, which we rescale to our best value $B(B^0 \to J/\psi(1S)K^*(892)^0) = (1.27 \pm 0.05) \times 10^{-3}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\phi\nu\overline{\nu})/\Gamma_{total}$ Γ_{177}/Γ

Test for $\Delta B = 1$ weak neutral current.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.4 × 10^{-3}	90	[1] ADAM	96D	DLPH	$e^+e^- \to Z$

[1] ADAM 96D assumes $f_{B^0} = f_{B^-} = 0.39$ and $f_{B_s} = 0.12$.

$\Gamma(\text{invisible})/\Gamma_{total}$ Γ_{178}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<5.6 \times 10^{-4}$	90	[1] ALONSO-ALV..24		THEO	$e^+e^- \to Z$

[1] A reinterpretation of an old inclusive ALEPH search for b-hadron decays with large missing energy reported in BARATE 01E.

$\Gamma(e^\pm\mu^\mp)/\Gamma_{total}$ Γ_{179}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.4 × 10^{-9}	90	[1] AAIJ	18T	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<1.1 \times 10^{-8}$	90	[2] AAIJ	13BM	LHCB	Repl. by AAIJ 18T
$<2.0 \times 10^{-7}$	90	AALTONEN	09P	CDF	$p\overline{p}$ at 1.96 TeV
$<6.1 \times 10^{-6}$	90	ABE	98V	CDF	Repl. by AALTONEN 09P
$<4.1 \times 10^{-5}$	90	[3] ACCIARRI	97B	L3	$e^+e^- \to Z$

[1] AAIJ 18T uses normalization modes $B(B^0 \to K^+\pi^-) = (19.6 \pm 0.5) \times 10^{-6}$ and $B(B^+ \to J/\psi K^+) = (1.026 \pm 0.031) \times 10^{-3}$ with B production ratio $f(\overline{b} \to B_s^0)/f(\overline{b} \to B_d^0) = 0.259 \pm 0.015$. The upper limit increases to 6×10^{-9} with the assumption of B_L-dominated decay amplitude.

[2] Uses normalization mode $B(B^0 \to K^+\pi^-) = (19.4 \pm 0.6) \times 10^{-6}$ and B production ratio $f(\overline{b} \to B_s^0)/f(\overline{b} \to B_d^0) = 0.256 \pm 0.020$.

[3] ACCIARRI 97B assume PDG 96 production fractions for B^+, B^0, B_s, and Λ_b.

$\Gamma(e^\pm\tau^\mp)/\Gamma_{total}$ Γ_{180}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<1.4 × 10^{-3}	90	[1] NAYAK	23	$e^+e^- \to \Upsilon(4S)$

[1] Reconstructs the accompanying B_s^0 meson in the semileptonic decay modes.

$\Gamma(\mu^\pm\tau^\mp)/\Gamma_{total}$ — Γ_{181}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<4.2 × 10^{-5}	95	[1] AAIJ	19AK	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<7.3\times10^{-4}$	90	[2] NAYAK	23	BELL	$e^+e^-\to\Upsilon(4S)$

[1] Assuming no contribution from $B^0\to\mu^\pm\tau^\mp$.
[2] Reconstructs the accompanying B_s^0 meson in the semileptonic decay modes.

$\Gamma(\phi\mu^\pm e^\mp)/\Gamma_{total}$ — Γ_{182}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.6 × 10^{-8}	90	[1] AAIJ	23G	LHCB	pp at 7, 8, 13 TeV

[1] Uses the uniform phase space model for the signal decays.

$\Gamma(\phi\mu^\pm\tau^\mp)/\Gamma_{total}$ — Γ_{183}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.0 × 10^{-5}	90	AAIJ	24AK	LHCB	pp at 7, 8 and 13 TeV

$\Gamma(p\mu^-)/\Gamma_{total}$ — Γ_{184}/Γ

VALUE	CL%	DOCUMENT ID		COMMENT
<1.21 × 10^{-8}	90	[1] AAIJ	23Y	pp at 7, 8, 13 TeV

[1] Assumes that B_s^0 decay branching fractions to $p\mu^-$ and $\overline{p}\mu^+$ are the same.

POLARIZATION IN B_s^0 DECAY

In decays involving two vector mesons, one can distinguish among the states in which meson polarizations are both longitudinal (L), or both are transverse and parallel ($\parallel$), or perpendicular ($\perp$) to each other with the parameters Γ_L/Γ, $\Gamma_\perp/\Gamma$, and the relative phases $\phi_\parallel$ and $\phi_\perp$. In decays involving two tensor mesons, the transverse polarization states are described by parameters $\Gamma_{\parallel1}$, $\Gamma_{\parallel2}$, $\Gamma_{\perp1}$, $\Gamma_{\perp2}$ and their relative phases $\phi_{\parallel1}$, $\phi_{\parallel2}$, $\phi_{\perp1}$, $\phi_{\perp2}$. See also the review on "Polarization in B Decays."

Γ_L/Γ in $B_s^0\to D_s^*\rho^+$

VALUE	DOCUMENT ID		TECN	COMMENT
$1.05^{+0.08}_{-0.10}{}^{+0.03}_{-0.04}$	LOUVOT	10	BELL	$e^+e^-\to\Upsilon(5S)$

Γ_L/Γ in $B_s^0\to J/\psi(1S)\phi$

VALUE	DOCUMENT ID		TECN	COMMENT
0.5194±0.0034 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below.			
$0.5179\pm0.0017\pm0.0032$	[1] AAIJ	24A	LHCB	pp at 13 TeV
$0.5152\pm0.0012\pm0.0034$	[2] AAD	21AE	ATLS	pp at 7, 8, 13 TeV
$0.5289\pm0.0038\pm0.0041$	[3] SIRUNYAN	21E	CMS	pp at 8, 13 TeV
$0.524\pm0.013\pm0.015$	[3] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
$0.558^{+0.017}_{-0.019}$	[3,4] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
$0.61\pm0.14\pm0.02$	[5] AFFOLDER	00N	CDF	$p\overline{p}$ at 1.8 TeV
$0.56\pm0.21{}^{+0.02}_{-0.04}$	ABE	95Z	CDF	$p\overline{p}$ at 1.8 TeV

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

$0.5350 \pm 0.0047 \pm 0.0049$	[3] SIRUNYAN	21E	CMS	pp at 13 TeV
$0.5186 \pm 0.0029 \pm 0.0023$	AAIJ	19Q	LHCB	Repl. by AAIJ 24A
$0.522 \pm 0.003 \pm 0.007$	[2] AAD	16AP	ATLS	Repl. by AAD 21AE
$0.510 \pm 0.005 \pm 0.011$	[3] KHACHATRY...	16S	CMS	pp at 8 TeV
$0.5241 \pm 0.0034 \pm 0.0067$	AAIJ	15I	LHCB	Repl. by AAIJ 19Q
$0.529 \pm 0.006 \pm 0.012$	[2] AAD	14U	ATLS	Repl. by AAD 16AP
$0.539 \pm 0.014 \pm 0.016$	[3] AAD	12CV	ATLS	Repl. by AAD 14U
$0.555 \pm 0.027 \pm 0.006$	[6] ABAZOV	09E	D0	Repl. by ABAZOV 12D
$0.531 \pm 0.020 \pm 0.007$	[3] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
$0.62 \pm 0.06 \pm 0.01$	ACOSTA	05	CDF	Repl. by AALTONEN 08J

[1] Measured using a time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ decays.

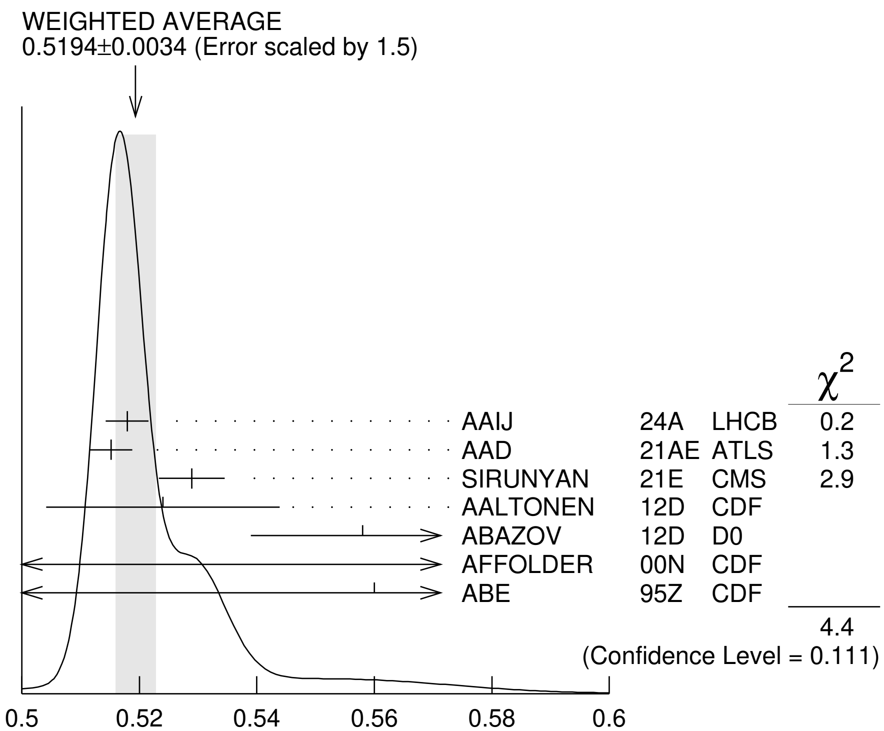
[2] Measured using the flavor tagged, time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays.

[3] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays.

[4] The error includes both statistical and systematic uncertainties.

[5] AFFOLDER 00N measurements are based on 40 B_s^0 candidates obtained from a data sample of 89 pb^{-1}. The P-wave fraction is found to be $0.23 \pm 0.19 \pm 0.04$.

[6] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B_d^0 \to J/\psi K^{*0}$ and $B_s^0 \to J/\psi \phi$.



Γ_L/Γ in $B_s^0 \to J/\psi(1S)\phi$

Γ_L/Γ in $B_s^0 \to D_s^{*+} D_s^{*-}$

VALUE	DOCUMENT ID		TECN	COMMENT
$0.06^{+0.18}_{-0.17} \pm 0.03$	ESEN	13	BELL	$e^+ e^- \to \Upsilon(5S)$

$\Gamma_{\parallel}/\Gamma$ in $B_s^0 \to J/\psi(1S)\phi$

VALUE	DOCUMENT ID		TECN	COMMENT
0.2222±0.0027 OUR AVERAGE				
0.2220±0.0017±0.0021	[1] AAD	21AE	ATLS	pp at 7, 8, 13 TeV
0.231 ±0.014 ±0.015	[2] AALTONEN	12D	CDF	$p\overline{p}$ at 1.96 TeV
0.231 $^{+0.024}_{-0.030}$	[2,3] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.227 ±0.004 ±0.006	[1] AAD	16AP	ATLS	Repl. by AAD 21AE
0.220 ±0.008 ±0.009	[1] AAD	14U	ATLS	Repl. by AAD 16AP
0.224 ±0.010 ±0.009	[2] AAD	12CV	ATLS	Repl. by AAD 14U
0.244 ±0.032 ±0.014	[4] ABAZOV	09E	D0	Repl. by ABAZOV 12D
0.230 ±0.029 ±0.011	[2] AALTONEN	08J	CDF	Repl. by AALTONEN 12D
0.260 ±0.084 ±0.013	ACOSTA	05	CDF	Repl. by AALTONEN 08J

[1] Measured using a tagged, time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

[2] Measured using the time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

[3] The error includes both statistical and systematic uncertainties.

[4] Measured the angular and lifetime parameters for the time-dependent angular untagged decays $B_d^0 \to J/\psi K^{*0}$ and $B_s^0 \to J/\psi\phi$.

$\Gamma_{\perp}/\Gamma$ in $B_s^0 \to J/\psi(1S)\phi$

VALUE	DOCUMENT ID		TECN	COMMENT
0.2447±0.0029 OUR AVERAGE				
0.2463±0.0023±0.0024	[1] AAIJ	24A	LHCB	pp at 13 TeV
0.2393±0.0050±0.0037	SIRUNYAN	21E	CMS	pp at 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.2337±0.0063±0.0045	SIRUNYAN	21E	CMS	pp at 13 TeV
0.2456±0.0040±0.0019	AAIJ	19Q	LHCB	Repl. by AAIJ 24A
0.243 ±0.008 ±0.012	KHACHATRY...	16S	CMS	pp at 8 TeV
0.2504±0.0049±0.0036	AAIJ	15I	LHCB	Repl. by AAIJ 19Q

[1] Measured using a time-dependent angular analysis of $B_s^0 \to J/\psi K^+K^-$ decays.

$\phi_{\parallel}$ in $B_s^0 \to J/\psi(1S)\phi$

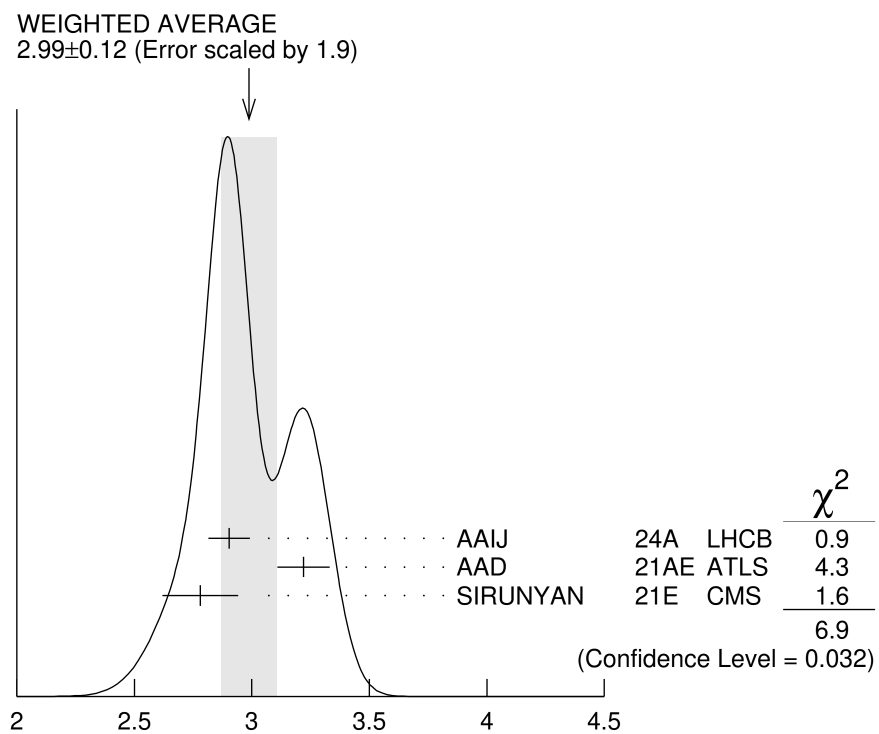
VALUE (rad)	DOCUMENT ID		TECN	COMMENT
3.22 ±0.05 OUR AVERAGE				
3.146±0.061±0.052	[1] AAIJ	24A	LHCB	pp at 13 TeV
3.36 ±0.05 ±0.09	[2] AAD	21AE	ATLS	pp at 7, 8, 13 TeV
3.19 ±0.12 ±0.04	SIRUNYAN	21E	CMS	pp at 8, 13 TeV
3.15 ±0.22	[3] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.18 ±0.12 ±0.003	SIRUNYAN	21E	CMS	pp at 13 TeV
3.06 $^{+0.08}_{-0.07}$ ±0.04	AAIJ	19Q	LHCB	Repl. by AAIJ 24A
3.15 ±0.10 ±0.05	AAD	16AP	ATLS	Repl. by AAD 21AE
3.48 $^{+0.07}_{-0.09}$ ±0.68	KHACHATRY...	16S	CMS	pp at 8 TeV
3.26 $^{+0.10}_{-0.17}$ $^{+0.06}_{-0.07}$	AAIJ	15I	LHCB	Repl. by AAIJ 19Q
2.72 $^{+1.12}_{-0.27}$ ±0.26	ABAZOV	09E	D0	Repl. by ABAZOV 12D

[1] Measured using a time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ decays.
[2] The fit found another solution with $\phi_{\parallel} = 2.95 \pm 0.05 \pm 0.09$ rad.
[3] The error includes both statistical and systematic uncertainties.

$\phi_\perp$ in $B_s^0 \to J/\psi(1S)\phi$

VALUE (rad)	DOCUMENT ID		TECN	COMMENT
2.99 ±0.12 OUR AVERAGE	Error includes scale factor of 1.9. See the ideogram below.			
$2.903^{+0.075}_{-0.074} \pm 0.048$	[1] AAIJ	24A	LHCB	pp at 13 TeV
$3.22 \pm 0.10 \pm 0.05$	[2] AAD	21AE	ATLS	pp at 7, 8, 13 TeV
$2.78 \pm 0.15 \pm 0.06$	[3] SIRUNYAN	21E	CMS	pp at 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$2.77 \pm 0.16 \pm 0.05$	[3] SIRUNYAN	21E	CMS	pp at 13 TeV
$2.64 \pm 0.13 \pm 0.10$	AAIJ	19Q	LHCB	Repl. by AAIJ 24A
$4.15 \pm 0.32 \pm 0.16$	[3] AAD	16AP	ATLS	Repl. by AAD 21AE
$2.98 \pm 0.36 \pm 0.66$	[3] KHACHATRY...	16S	CMS	pp at 8 TeV
$3.08 ^{+0.14}_{-0.15} \pm 0.06$	AAIJ	15I	LHCB	Repl. by AAIJ 19Q
$3.89 \pm 0.47 \pm 0.11$	[3] AAD	14U	ATLS	Repl. by AAD 16AP

[1] Measured using a time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ decays.
[2] The fit found another solution with $\phi_\perp = 3.03 \pm 0.05 \pm 0.09$ rad.
[3] Measured using a tagged, time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays.



$\phi_\perp$ in $B_s^0 \to J/\psi(1S)\phi$ (rad)

$\Gamma_\perp/\Gamma$ in $B_s^0 \to \psi(2S)\phi$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.264^{+0.024}_{-0.023} \pm 0.002}$	[1] AAIJ	16AK	LHCB	pp at 7, 8 TeV

[1] Measured using time-dependent angular analysis of $B_s^0 \to \psi(2S)\phi$ decays.

$\phi_\parallel$ in $B_s^0 \to \psi(2S)\phi$

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
$3.67^{+0.13}_{-0.18}\pm0.03$	[1] AAIJ 16AK	LHCB	pp at 7, 8 TeV

[1] Measured using time-dependent angular analysis of $B_s^0 \to \psi(2S)\phi$ decays.

$\phi_\perp$ in $B_s^0 \to \psi(2S)\phi$

VALUE (rad)	DOCUMENT ID	TECN	COMMENT
$3.29^{+0.43}_{-0.39}\pm0.04$	[1] AAIJ 16AK	LHCB	pp at 7, 8 TeV

[1] Measured using time-dependent angular analysis of $B_s^0 \to \psi(2S)\phi$ decays.

Γ_L/Γ for $B_s^0 \to J/\psi(1S)\overline{K}^*(892)^0$

Longitudinal polarization fraction, equals to f_L using notation of "Polarization in B decays" review.

VALUE	DOCUMENT ID	TECN	COMMENT
0.497±0.025±0.025	AAIJ 15AV	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.50 ±0.08 ±0.02	[1] AAIJ 12AP	LHCB	Repl. by AAIJ 15AV

[1] The non-resonant $K\pi$ background contributions are subtracted. Also reports an S-wave amplitude $|A_S|^2 = 0.07^{+0.15}_{-0.07}$.

$\Gamma_\parallel/\Gamma$ for $B_s^0 \to J/\psi(1S)\overline{K}^*(892)^0$

Parallel polarization fraction, equals to $1 - f_L - f_\perp$ using notation of "Polarization in B decays" review.

VALUE	DOCUMENT ID	TECN	COMMENT
0.179±0.027±0.013	AAIJ 15AV	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.19\ ^{+0.10}_{-0.08}\ \pm0.02$	[1] AAIJ 12AP	LHCB	Repl. by AAIJ 15AV

[1] The non-resonant $K\pi$ background contributions are subtracted. Also reports an S-wave amplitude $|A_S|^2 = 0.07^{+0.15}_{-0.07}$.

$\Gamma_\parallel/\Gamma$ of $K^*(892)^0$ in $B_s^0 \to \psi(2S)\overline{K}^*(892)^0$

VALUE	DOCUMENT ID	TECN	COMMENT
0.524±0.056±0.029	AAIJ 15U	LHCB	pp at 7, 8 TeV

Γ_L/Γ in $B_s^0 \to \phi\phi$

VALUE	DOCUMENT ID	TECN	COMMENT
0.379±0.008 OUR AVERAGE	Error includes scale factor of 1.2.		
0.384±0.007±0.003	AAIJ 23AT	LHCB	pp at 13 TeV
0.364±0.012±0.009	AAIJ 14AE	LHCB	pp at 7, 8 TeV
0.348±0.041±0.021	AALTONEN 11AN	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.381±0.007±0.012	AAIJ 19AP	LHCB	pp at 7, 8, partial 13 TeV
0.365±0.022±0.012	AAIJ 12P	LHCB	Repl. by AAIJ 14AE

$\Gamma_\perp/\Gamma$ in $B_s^0 \to \phi\phi$

VALUE	DOCUMENT ID		TECN	COMMENT
0.310±0.006 OUR AVERAGE				
0.310±0.006±0.003	AAIJ	23AT	LHCB	pp at 13 TeV
0.305±0.013±0.005	AAIJ	14AE	LHCB	pp at 7, 8 TeV
0.365±0.044±0.027	AALTONEN	11AN	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.290±0.008±0.005	[1] AAIJ	19AP	LHCB	pp at 7, 8, partial 13 TeV
0.291±0.024±0.010	AAIJ	12P	LHCB	Repl. by AAIJ 14AE

[1] Note: in the summary of AAIJ 19AP the systematic uncertainty is 0.007. We take the systematic uncertainty as given in Table 5 in the paper.

$\phi_\parallel$ in $B_s^0 \to \phi\phi$

VALUE (rad)	DOCUMENT ID		TECN	COMMENT
2.469±0.029 OUR AVERAGE				
2.463±0.029±0.009	AAIJ	23AT	LHCB	pp at 13 TeV
2.54 ±0.07 ±0.09	[1] AAIJ	14AE	LHCB	pp at 7, 8 TeV
2.71 $^{+0.31}_{-0.36}$ ±0.22	[2] AALTONEN	11AN	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.559±0.045±0.033	AAIJ	19AP	LHCB	pp at 7, 8, partial 13 TeV
2.57 ±0.15 ±0.06	[3] AAIJ	12P	LHCB	Repl. by AAIJ 14AE

[1] AAIJ 14AE reports measurement of $\phi_\perp$ and $\phi_\perp - \phi_\parallel$, which we convert into $\phi_\parallel$. Statistical uncertainty includes correlation between measured parameters, while systematic uncertainties are assumed uncorrelated.

[2] AALTONEN 11AN quotes $\cos\phi_\parallel = -0.91^{+0.15}_{-0.13} \pm 0.09$ which we convert to $\phi_\parallel$ taking the smaller solution.

[3] AAIJ 12P quotes $\cos\phi_\parallel = -0.844 \pm 0.068 \pm 0.029$ which we convert to $\phi_\parallel$, taking the smaller solution.

$\phi_\perp$ in $B_s^0 \to \phi\phi$

VALUE (rad)	DOCUMENT ID		TECN	COMMENT
2.75 ±0.10 OUR AVERAGE				
2.769±0.105±0.011	AAIJ	23AT	LHCB	pp at 13 TeV
2.67 ±0.23 ±0.07	AAIJ	14AE	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.818±0.178±0.073	AAIJ	19AP	LHCB	pp at 7, 8, partial 13 TeV

Γ_L/Γ in $B_s^0 \to K^{*0}\overline{K}^{*0}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.240±0.031±0.025	[1] AAIJ	19L	LHCB	pp at 7 and 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.208±0.032±0.046	[2] AAIJ	18S	LHCB	Repl. by AAIJ 19L
0.201±0.057±0.040	[3] AAIJ	15AF	LHCB	Repl. by AAIJ 18S
0.31 ±0.12 ±0.04	AAIJ	12F	LHCB	Repl. by AAIJ 15AF

[1] Untagged and time-integrated analysis within 150 MeV of the K^{*0} mass.

[2] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

[3] Measured in angular analysis, which takes into account S-wave contributions.

$\Gamma_\perp/\Gamma$ in $B_s^0 \to K^{*0}\overline{K}^{*0}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.38±0.11±0.04	AAIJ	12F	LHCB	pp at 7 TeV

$\Gamma_\parallel/\Gamma$ in $B_s^0 \to K^*(892)^0\overline{K}^*(892)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.297±0.029±0.042	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.215±0.046±0.015	AAIJ	15AF	LHCB	Repl. by AAIJ 18S

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Phi_\parallel$ in $B_s^0 \to K^*(892)^0\overline{K}^*(892)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
2.40±0.11±0.33	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5.31±0.24±0.14	AAIJ	15AF	LHCB	Repl. by AAIJ 18S

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Phi_\perp$ in $B_s^0 \to K^*(892)^0\overline{K}^*(892)^0$

VALUE (rad)	DOCUMENT ID		TECN	COMMENT
2.62±0.26±0.64	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

Γ_L/Γ in $B_s^0 \to \phi\overline{K}^{*0}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.51±0.15±0.07	AAIJ	13BW	LHCB	pp at 7 TeV

$\Gamma_\parallel/\Gamma$ in $B_s^0 \to \phi\overline{K}^{*0}$

VALUE	DOCUMENT ID		TECN	COMMENT
0.21±0.11±0.02	AAIJ	13BW	LHCB	pp at 7 TeV

$\phi_\parallel$ in $B_s^0 \to \phi\overline{K}^{*0}$

VALUE (rad)	DOCUMENT ID		TECN	COMMENT
1.75±0.53±0.29	[1] AAIJ	13BW	LHCB	pp at 7 TeV

[1] Measures $\cos(\phi_\parallel) = -0.18 \pm 0.52 \pm 0.29$, which we convert to $\phi_\parallel$ by taking the smaller solution.

Γ_L/Γ in $B_s^0 \to \overline{D}^{*0}\phi$

VALUE	DOCUMENT ID		TECN	COMMENT
0.531±0.060±0.019	AAIJ	23AZ	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.73 ±0.15 ±0.04	AAIJ	18AY	LHCB	Repl. by AAIJ 23AZ

Γ_L/Γ in $B_s^0 \to K^*(892)^0\overline{K}_2^*(1430)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.911±0.020±0.165	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Gamma_{\parallel}/\Gamma$ in $B^0_s \to K^*(892)^0 \overline{K}{}^*_2(1430)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.012±0.008±0.053	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

Γ_L/Γ in $B^0_s \to K^*_2(1430)^0 \overline{K}{}^*(892)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.62±0.16±0.25	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Gamma_{\parallel}/\Gamma$ in $B^0_s \to K^*_2(1430)^0 \overline{K}{}^*(892)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.24±0.10±0.14	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

Γ_L/Γ in $B^0_s \to K^*_2(1430)^0 \overline{K}{}^*_2(1430)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.25±0.14±0.18	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Gamma_{\parallel 1}/\Gamma$ in $B^0_s \to K^*_2(1430)^0 \overline{K}{}^*_2(1430)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.17±0.11±0.14	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Gamma_{\perp 1}/\Gamma$ in $B^0_s \to K^*_2(1430)^0 \overline{K}{}^*_2(1430)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.30±0.18±0.21	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave. contributions.

$\Gamma_{\parallel 2}/\Gamma$ in $B^0_s \to K^*_2(1430)^0 \overline{K}{}^*_2(1430)^0$

VALUE	DOCUMENT ID		TECN	COMMENT
0.015±0.033±0.107	[1] AAIJ	18S	LHCB	pp at 7, 8 TeV

[1] Measured in angular analysis, which takes into account S-, P- and D-wave . contributions.

$F_L(B^0_s \to \phi\mu^+\mu^-)$ $(0.10 < q^2 < 2.00\ \mathrm{GeV}^2/c^4)$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.20^{+0.08}_{-0.09}\pm0.02}$	AAIJ	15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.37^{+0.19}_{-0.17}\pm0.07$	AAIJ	13X	LHCB	Repl. by AAIJ 15AQ

$F_L(B^0_s \to \phi\mu^+\mu^-)$ $(2.00 < q^2 < 5.0\ \mathrm{GeV}^2/c^4)$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.68^{+0.16}_{-0.13}\pm0.03}$	AAIJ	15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.53^{+0.25}_{-0.23}\pm0.10$	[1] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $2.0 < q^2 < 4.3\ \mathrm{GeV}^2/c^4$.

$F_L(B_s^0 \to \phi\mu^+\mu^-)$ ($5.0 < q^2 < 8.0$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$0.54^{+0.10}_{-0.09}\pm0.02$	AAIJ 15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.81^{+0.11}_{-0.13}\pm0.05$	[1] AAIJ 13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $4.3 < q^2 < 8.68$ GeV^2/c^4.

$F_L(B_s^0 \to \phi\mu^+\mu^-)$ ($11.0 < q^2 < 12.5$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$0.29\pm0.11\pm0.04$	AAIJ 15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.33^{+0.14}_{-0.12}\pm0.06$	[1] AAIJ 13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $10.09 < q^2 < 12.90$ GeV^2/c^4.

$F_L(B_s^0 \to \phi\mu^+\mu^-)$ ($15.0 < q^2 < 17.0$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$0.23^{+0.09}_{-0.08}\pm0.02$	AAIJ 15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.34^{+0.18}_{-0.17}\pm0.07$	[1] AAIJ 13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $14.18 < q^2 < 16$ GeV^2/c^4.

$F_L(B_s^0 \to \phi\mu^+\mu^-)$ ($17.0 < q^2 < 19.0$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$0.40^{+0.13}_{-0.15}\pm0.02$	AAIJ 15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.16^{+0.17}_{-0.10}\pm0.07$	[1] AAIJ 13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $16.0 < q^2 < 19.0$ GeV^2/c^4.

$F_L(B_s^0 \to \phi\mu^+\mu^-)$ ($15.0 < q^2 < 18.9$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$0.359\pm0.031\pm0.019$	AAIJ 21AK	LHCB	pp at 7, 8, 13 TeV

$F_L(B_s^0 \to \phi\mu^+\mu^-)$ ($1.00 < q^2 < 6.00$ GeV^2/c^4)

VALUE	DOCUMENT ID	TECN	COMMENT
$0.715\pm0.036\pm0.013$	AAIJ 21AK	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.63\ ^{+0.09}_{-0.09}\ \pm0.03$	AAIJ 15AQ	LHCB	Repl. by AAIJ 21AK
$0.56\ ^{+0.17}_{-0.16}\ \pm0.09$	AAIJ 13X	LHCB	Repl. by AAIJ 15AQ

B_s^0-$\overline{B}_s^0$ MIXING

For a discussion of B_s^0-$\overline{B}_s^0$ mixing see the note on "B^0-$\overline{B}^0$ Mixing" in the B^0 Particle Listings above.

χ_s is a measure of the time-integrated B_s^0-$\overline{B}_s^0$ mixing probability that produced $B_s^0(\overline{B}_s^0)$ decays as a $\overline{B}_s^0(B_s^0)$. Mixing violates $\Delta B \neq 2$ rule.

$$\chi_s = \frac{x_s^2}{2(1+x_s^2)}$$

$$x_s = \frac{\Delta m_{B_s^0}}{\Gamma_{B_s^0}} = (m_{B_{sH}^0} - m_{B_{sL}^0})\,\tau_{B_s^0}\ ,$$

where H, L stand for heavy and light states of two B_s^0 CP eigenstates and $\tau_{B_s^0} = \frac{1}{0.5(\Gamma_{B_{sH}^0}+\Gamma_{B_{sL}^0})}$.

$\Delta m_{B_s^0} = m_{B_{sH}^0} - m_{B_{sL}^0}$

$\Delta m_{B_s^0}$ is a measure of 2π times the B_s^0-$\overline{B}_s^0$ oscillation frequency in time-dependent mixing experiments.

VALUE (10^{12} $\hbar$ s^{-1})	CL%	DOCUMENT ID		TECN	COMMENT
17.765 ±0.006 OUR EVALUATION		(Produced by HFLAV)			
17.765 ±0.005 OUR AVERAGE					
17.743 ±0.033 ±0.009		[1] AAIJ	24A	LHCB	pp at 13 TeV
17.7683±0.0051±0.0032		[2] AAIJ	22B	LHCB	pp at 13 TeV
17.757 ±0.007 ±0.008		[3] AAIJ	21M	LHCB	pp at 7, 8, 13 TeV
17.51 $^{+0.10}_{-0.09}$ ±0.03		[4] SIRUNYAN	21E	CMS	pp at 13 TeV
17.768 ±0.023 ±0.006		[2] AAIJ	13BI	LHCB	pp at 7 TeV
17.93 ±0.22 ±0.15		[5] AAIJ	13CF	LHCB	pp at 7 TeV
17.77 ±0.10 ±0.07		[6] ABULENCIA,A	06G	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
17.703 ±0.059 ±0.018		[1] AAIJ	19Q	LHCB	Repl. by AAIJ 24A
17.711 $^{+0.055}_{-0.057}$ ±0.011		[1] AAIJ	15I	LHCB	Repl. by AAIJ 19Q
17.63 ±0.11 ±0.02		[7] AAIJ	12I	LHCB	Repl. by AAIJ 21M
17–21	90	[8] ABAZOV	06B	D0	$p\overline{p}$ at 1.96 TeV
17.31 $^{+0.33}_{-0.18}$ ±0.07		[9] ABULENCIA	06Q	CDF	Repl. by ABULENCIA,A 06G
> 8.0	95	[10] ABDALLAH	04J	DLPH	$e^+e^- \to Z^0$
> 4.9	95	[11] ABDALLAH	04J	DLPH	$e^+e^- \to Z^0$
> 8.5	95	[12] ABDALLAH	04J	DLPH	$e^+e^- \to Z^0$
> 5.0	95	[13] ABDALLAH	03B	DLPH	$e^+e^- \to Z$
>10.3	95	[14] ABE	03	SLD	$e^+e^- \to Z$
>10.9	95	[15] HEISTER	03E	ALEP	$e^+e^- \to Z$
> 5.3	95	[16] ABE	02V	SLD	$e^+e^- \to Z$
> 1.0	95	[17] ABBIENDI	01D	OPAL	$e^+e^- \to Z$

$>$ 7.4	95	[18] ABREU	00Y	DLPH	Repl. by ABDALLAH 04J
$>$ 4.0	95	[19] ABREU,P	00G	DLPH	$e^+e^- \rightarrow Z$
$>$ 5.2	95	[20] ABBIENDI	99S	OPAL	$e^+e^- \rightarrow Z$
$<$96	95	[21] ABE	99D	CDF	$p\overline{p}$ at 1.8 TeV
$>$ 5.8	95	[22] ABE	99J	CDF	$p\overline{p}$ at 1.8 TeV
$>$ 9.6	95	[23] BARATE	99J	ALEP	$e^+e^- \rightarrow Z$
$>$ 7.9	95	[24] BARATE	98C	ALEP	Repl. by BARATE 99J
$>$ 3.1	95	[25] ACKERSTAFF	97U	OPAL	Repl. by ABBIENDI 99S
$>$ 2.2	95	[26] ACKERSTAFF	97V	OPAL	Repl. by ABBIENDI 99S
$>$ 6.5	95	[27] ADAM	97	DLPH	Repl. by ABREU 00Y
$>$ 6.6	95	[28] BUSKULIC	96M	ALEP	Repl. by BARATE 98C
$>$ 2.2	95	[26] AKERS	95J	OPAL	Sup. by ACKERSTAFF 97V
$>$ 5.7	95	[29] BUSKULIC	95J	ALEP	$e^+e^- \rightarrow Z$
$>$ 1.8	95	[26] BUSKULIC	94B	ALEP	$e^+e^- \rightarrow Z$

[1] Measured using time-dependent angular analysis of $B_s^0 \rightarrow J/\psi K^+ K^-$ decays.

[2] Measured using $B_s^0 \rightarrow D_s^- \pi^+$ decays.

[3] Measured using $B_s^0 \rightarrow D_s^- \pi^+ \pi^- \pi^+$ decays.

[4] Measured using time-dependent angular analysis of $B_s^0 \rightarrow J/\psi \phi$ decays.

[5] Measured using $B_s^0 \rightarrow D_s^- \mu^+ \nu_\mu X$ decays.

[6] Significance of oscillation signal is 5.4 σ. Also reports $|V_{td} / V_{ts}| = 0.2060 \pm 0.0007^{+0.0081}_{-0.0060}$.

[7] Measured using $B_s^0 \rightarrow D_s^- \pi^+$ and $D_s^- \pi^+ \pi^- \pi^+$ decays.

[8] A likelihood scan over the oscillation frequency, Δm_s, gives a most probable value of 19 ps^{-1} and a range of 17$<$ Δm_s $<$21 (ps^{-1}) at 90% C.L. assuming Gaussian uncertainties. Also excludes Δm_s $<$14.8 ps^{-1} at 95% C.L

[9] Significance of oscillation signal is 0.2%. Also reported the value $|V_{td} / V_{ts}| = 0.208^{+0.001}_{-0.002}{}^{+0.008}_{-0.006}$.

[10] Uses leptons emitted with large momentum transverse to a jet and improved techniques for vertexing and flavor-tagging.

[11] Updates of D_s-lepton analysis.

[12] Combined results from all Delphi analyses.

[13] Events with a high transverse momentum lepton were removed and an inclusively reconstructed vertex was required.

[14] ABE 03 uses the novel "charge dipole" technique to reconstruct separate secondary and tertiary vertices originating from the $B \rightarrow D$ decay chain. The analysis excludes Δm_s $<$4.9 ps^{-1} and 7.9$<$ Δm_s $<$10.3 ps^{-1}.

[15] Three analyses based on complementary event selections: (1) fully-reconstructed hadronic decays; (2) semileptonic decays with D_s exclusively reconstructed; (3) inclusive semileptonic decays.

[16] ABE 02V uses exclusively reconstructed D_s^- mesons and excludes Δm_s $<$1.4 ps^{-1} and 2.4$<$ Δm_s $<$5.3 ps^{-1} at 95%CL.

[17] Uses fully or partially reconstructed $D_s \ell$ vertices and a mixing tag as a flavor tagging.

[18] Replaced by ABDALLAH 04A. Uses $D_s^- \ell^+$, and $\phi \ell^+$ vertices, and a multi-variable discriminant as a flavor tagging.

[19] Uses inclusive D_s vertices and fully reconstructed B_s decays and a multi-variable discriminant as a flavor tagging.

[20] Uses ℓ-Q_{hem} and ℓ-ℓ.

[21] ABE 99D assumes $\tau_{B^0_s}$= 1.55 ± 0.05 ps and $\Delta\Gamma/\Delta m$= (5.6 ± 2.6) × 10^{-3}.

[22] ABE 99J uses ϕ ℓ-ℓ correlation.

[23] BARATE 99J uses combination of an inclusive lepton and D_s^--based analyses.

[24] BARATE 98C combines results from $D_s\,h$-ℓ/Q_{hem}, $D_s\,h$-K in the same side, $D_s\,\ell$-ℓ/Q_{hem} and $D_s\,\ell$-K in the same side.

[25] Uses ℓ-Q_{hem}.

[26] Uses ℓ-ℓ.

[27] ADAM 97 combines results from $D_s\,\ell$-Q_{hem}, ℓ-Q_{hem}, and ℓ-ℓ.

[28] BUSKULIC 96M uses D_s lepton correlations and lepton, kaon, and jet charge tags.

[29] BUSKULIC 95J uses ℓ-Q_{hem}. They find Δm_s > 5.6 [> 6.1] for f_s=10% [12%]. We interpolate to our central value f_s=10.5%.

$x_s = \Delta m_{B^0_s}/\Gamma_{B^0_s}$

Derived from the results on $\Delta m_{B^0_s}$ and "OUR EVALUATION" of the B^0_s mean lifetime.

VALUE	DOCUMENT ID
26.93±0.10 OUR EVALUATION	(Produced by HFLAV)

χ_s

This is a B^0_s-$\overline{B}^0_s$ integrated mixing parameter derived from x_s above and OUR EVALUATION of $\Delta\Gamma_{B^0_s}/\Gamma_{B^0_s}$.

VALUE	DOCUMENT ID
0.499314±0.000005 OUR EVALUATION	(Produced by HFLAV)

CP VIOLATION PARAMETERS in B^0_s

Re($\epsilon_{B^0_s}$) / (1 + $|\epsilon_{B^0_s}|^2$)

CP impurity in B^0_s system.

"OUR EVALUATION" is the result of a fit to B_d and B_s *CP* asymmetries, which includes the B_s measurements listed below and the B_d measurements listed in the B_d section, and takes into account correlations between those measurements.

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
−0.15±0.70 OUR EVALUATION	(Produced by HFLAV)			
0.0 ±1.1 OUR AVERAGE	Error includes scale factor of 1.6. See the ideogram below.			
0.98±0.65±0.5	[1] AAIJ	16G	LHCB	pp at 7, 8 TeV
−2.15±1.85	[2] ABAZOV	14	D0	$p\overline{p}$ at 1.96 TeV
−2.8 ±1.9 ±0.4	[3] ABAZOV	13	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.15±1.25±0.90	[4] AAIJ	14D	LHCB	Repl. by AAIJ 16G
−4.5 ±2.7	[5] ABAZOV	11U	D0	Repl. by ABAZOV 14
−0.4 ±2.3 ±0.4	[6] ABAZOV	10E	D0	Repl. by ABAZOV 13
−3.6 ±1.9	[7] ABAZOV	10H	D0	Repl. by ABAZOV 11U
6.1 ±4.8 ±0.9	[8] ABAZOV	07A	D0	Repl. by ABAZOV 10E

[1] AAIJ 16G reports a measurement of time-integrated flavor-specific asymmetry in $B^0_s \to \mu^+ D_s^- X$ decays, A^s_{SL} = (0.39 ± 0.26 ± 0.20)%, which is approximately equal to 4 × Re($\epsilon_{B^0_s}$) / (1 + $|\epsilon_{B^0_s}|^2$).

[2] ABAZOV 14 uses the dimuon charge asymmetry with different impact parameters from which it reports $A^s_{SL} = (-0.86 \pm 0.74) \times 10^{-2}$.

[3] ABAZOV 13 reports a measurement of time-integrated flavor-specific asymmetry in mixed semileptonic $B^0_s \to \mu^+ D^-_s X$ decays $A^s_{SL} = (-1.12 \pm 0.74 \pm 0.17)\%$ which is approximately equal to 4 × $\mathrm{Re}(\epsilon_{B^0_s})$ / $(1 + |\epsilon_{B^0_s}|^2)$.

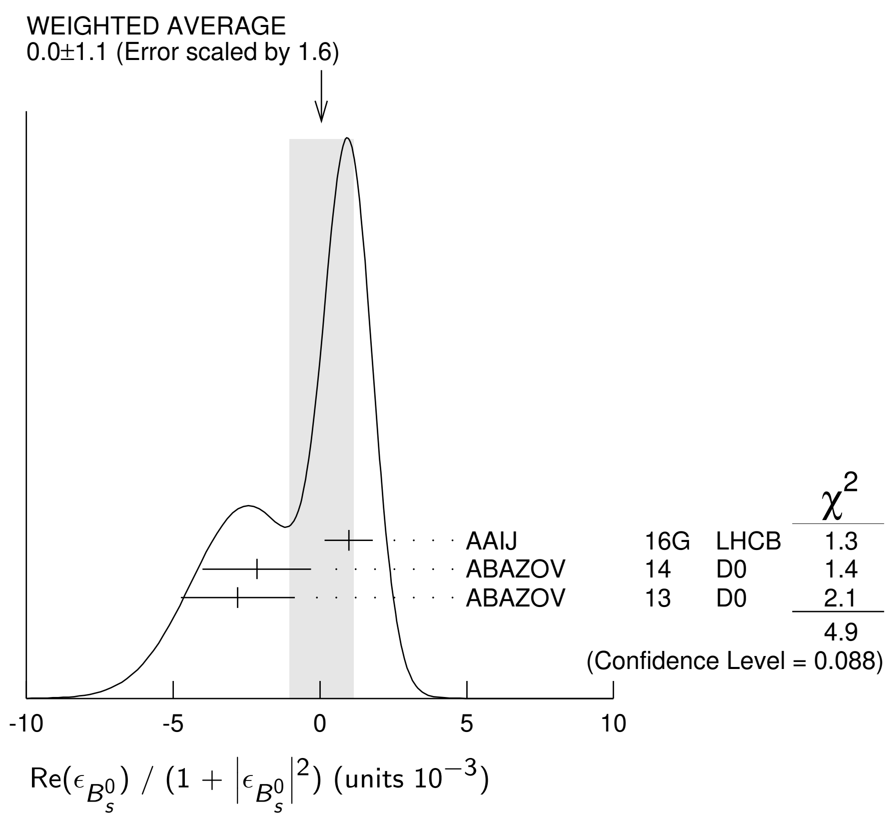
[4] AAIJ 14D reports a measurement of time-integrated flavor-specific asymmetry in $B^0_s \to \mu^+ D^-_s X$ decays, $A^s_{SL} = (-0.06 \pm 0.50 \pm 0.36)\%$, which is approximately equal to4 × $\mathrm{Re}(\epsilon_{B^0_s})$ / $(1 + |\epsilon_{B^0_s}|^2)$.

[5] ABAZOV 11U uses the dimuon charge asymmetry with different impact parameters from which it reports $A^s_{SL} = (-18.1 \pm 10.6) \times 10^{-3}$.

[6] ABAZOV 10E reports a measurement of flavor-specific asymmetry in $B^0_{(s)} \to \mu^+ D^{*-}_{(s)} X$ decays with a decay-time analysis including initial-state flavor tagging, $A^s_{SL} = (-1.7 \pm 9.1^{+1.4}_{-1.5}) \times 10^{-3}$ which is approximately equal to 4 × $\mathrm{Re}(\epsilon_{B^0_s})$ / $(1 + |\epsilon_{B^0_s}|^2)$.

[7] ABAZOV 10H reports a measurement of like-sign dimuon charge asymmetry of $A^s_{SL} = (-9.57 \pm 2.51 \pm 1.46) \times 10^{-3}$ in semileptonic b-hadron decays. Using the measured production ratio of B^0_d and B^0_0, and the asymmetry of B^0_d $A^s_{SL} = (-4.7 \pm 4.6) \times 10^{-3}$ measured from B-factories, they obtain the asymmetry for B^0_s.

[8] The first direct measurement of the time integrated flavor untagged charge asymmetry in semileptonic B^0_s decays is reported as $2 \times A^s_{SL}(\text{untagged}) = A^s_{SL} = (2.45 \pm 1.93 \pm 0.35) \times 10^{-2}$.



$C_{KK}(B^0_s \to K^+K^-)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.162±0.035 OUR AVERAGE				
0.164±0.034±0.014	AAIJ	21O	LHCB	pp at 13 TeV
0.14 ±0.11 ±0.03	AAIJ	13BO	LHCB	pp at 7 TeV

$S_{KK}(B^0_s \to K^+K^-)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.14 ±0.05 OUR AVERAGE	Error includes scale factor of 1.3.			
0.123±0.034±0.015	AAIJ	21O	LHCB	pp at 13 TeV
0.30 ±0.12 ±0.04	AAIJ	13BO	LHCB	pp at 7 TeV

$r_B(B^0_s \to D^\mp_s K^\pm)$

r_B and δ_B are the amplitude ratio and relative strong phase between the amplitudes of $A(B^0_s \to D^+_s K^-)$ and $A(B^0_s \to D^-_s K^+)$,

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.37^{+0.10}_{-0.09}}$	[1] AAIJ	18U	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.53^{+0.17}_{-0.16}$	[2] AAIJ	14BF	LHCB	Repl. by AAIJ 18U

[1] Measured in $B^0_s \to D^\mp_s K^\pm$ decays, constraining $-2\beta_s$ by the measurement of $\phi_s = -0.030 \pm 0.033$ from HFLAV.

[2] Measured in $B^0_s \to D^\mp_s K^\pm$ decays, constraining $-2\beta_s$ by the measurement of $\phi_s = 0.01 \pm 0.07 \pm 0.0$ from AAIJ 13AR. At 68% CL.

$r_B(B^0_s \to D^\mp_s K^\pm \pi^\pm \pi^\mp)$

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.47\pm0.08^{+0.02}_{-0.03}}$	[1,2] AAIJ	21M	LHCB	pp at 7, 8, 13 TeV

[1] Measured in restricted phase space with m($K^+\pi^+\pi^-$) < 1950 MeV, m($K^+\pi^-$) < 1200 MeV and m($\pi^+\pi^-$) < 1200 MeV.

[2] A model-independent coherence factor for the decay $B_s \to D_s K\pi\pi$ (in the restricted phase space region) is also reported.

$\delta_B(B^0_s \to D^\pm_s K^\mp)$

VALUE (°)	DOCUMENT ID		TECN	COMMENT
$\mathbf{358^{+13}_{-14}}$	[1] AAIJ	18U	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3^{+19}_{-20}	[2] AAIJ	14BF	LHCB	Repl. by AAIJ 18U

[1] Measured in $B^0_s \to D^\mp_s K^\pm$ decays, constraining $-2\beta_s$ by the measurement of $\phi_s = 0.030 \pm 0.033$ from HFLAV. The value is modulo 180°.

[2] Measured in $B^0_s \to D^\mp_s K^\pm$ decays, constraining $-2\beta_s$ by the measurement of $\phi_s = 0.01 \pm 0.07 \pm 0.0$ from AAIJ 13AR. The value is modulo 180° at 68% CL.

$\delta_B(B^0_s \to D^\pm_s K^\mp \pi^\pm \pi^\mp)$

VALUE (°)	DOCUMENT ID		TECN	COMMENT
$\mathbf{-6^{+10}_{-12}{}^{+2}_{-4}}$	[1,2] AAIJ	21M	LHCB	pp at 7, 8, 13 TeV

[1] Measured in restricted phase space with m($K^+\pi^+\pi^-$) $<$ 1950 MeV, m($K^+\pi^-$) $<$ 1200 MeV and m($\pi^+\pi^-$) $<$ 1200 MeV. The value is modulo 180°.
[2] A model-independent coherence factor for the decay $B_s \to D_s K\pi\pi$ (in the restricted phase space region) is also reported.

CP Violation phase β_s ($b \to c\overline{c}s$)

$-2\beta_s$ is the weak phase difference between B_s^0 mixing amplitude and the $B_s^0 \to J/\psi\phi$ decay amplitude driven by the $b \to c\overline{c}s$ transition (such as $B_s \to J/\psi\phi$, $J/\psi K^+K^-$, $J/\psi\pi^+\pi^-$, and $D_s^+ D_s^-$). The Standard Model value of β_s is arg($-\frac{V_{ts}V_{tb}^*}{V_{cs}V_{cb}^*}$) if penguin contributions are neglected.

VALUE (10^{-2} rad)	DOCUMENT ID		TECN	COMMENT
2.0 ± 0.8 OUR EVALUATION	(Produced by HFLAV)			
1.9 ± 0.8 OUR AVERAGE				
$4.3 \pm 5.3 \pm 1.4$	[1] AAIJ	25A	LHCB	pp at 13 TeV
$1.9 \pm 1.1 \pm 0.3$	[2] AAIJ	24A	LHCB	pp at 13 TeV
$4.05 \pm 2.05 \pm 1.10$	[3,4] AAD	21AE	ATLS	pp at 13 TeV
$0 \pm 14 \pm 4$	[5] AAIJ	21AN	LHCB	pp at 7, 8 TeV
$0.5 \pm 2.5 \pm 0.5$	[6,7] SIRUNYAN	21E	CMS	pp at 13 TeV
$2.85 \pm 3.00 \pm 0.55$	[8,9] AAIJ	19AF	LHCB	pp at 13 TeV
$-5.95 \pm 5.35 \pm 1.70$	[10] AAIJ	17V	LHCB	pp at 7, 8 TeV
$5.05 \pm 4.10 \pm 2.10$	[11,12] AAD	16AP	ATLS	pp at 8 TeV
$-11.5\ ^{+14}_{-14.5} \pm 1$	[13] AAIJ	16AK	LHCB	pp at 7, 8 TeV
$3.75 \pm 4.85 \pm 1.55$	[14] KHACHATRY...	16S	CMS	pp at 8 TeV
$2.9 \pm 2.5 \pm 0.3$	[15] AAIJ	15I	LHCB	pp at 7, 8 TeV
$-6 \pm 13 \pm 3$	[16] AAD	14U	ATLS	pp at 7 TeV
$-1 \pm 9 \pm 1$	[17] AAIJ	14AY	LHCB	pp at 7, 8 TeV
$-3.5 \pm 3.4 \pm 0.4$	[18] AAIJ	14S	LHCB	pp at 7, 8 TeV
	[19] AALTONEN	12AJ	CDF	$p\overline{p}$ at 1.96 TeV
$28\ ^{+18}_{-19}$	[20] ABAZOV	12D	D0	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$4.15 \pm 2.05 \pm 0.30$	[21] AAIJ	19Q	LHCB	Repl. by AAIJ 24A
$5.0 \pm 6.5 \pm 7.0$	[22] AAIJ	18S	LHCB	pp at 7, 8 TeV
$6\ ^{+8}_{-7}$	[23,24] AAIJ	15K	LHCB	pp at 7, 8 TeV
$-0.5 \pm 3.5 \pm 0.5$	[25] AAIJ	13AR	LHCB	Repl. by AAIJ 15I
$-11.0 \pm 20.5 \pm 5.0$	[26] AAD	12CV	ATLS	Repl. by AAD 14U
$22 \pm 22 \pm 1$	[27] AAIJ	12B	LHCB	Repl. by AAIJ 12Q
$-8 \pm 9 \pm 3$	[28] AAIJ	12D	LHCB	Repl. by AAIJ 13AR
$0.95\ ^{+8.70}_{-8.65}\ ^{+0.15}_{-0.20}$	[29] AAIJ	12Q	LHCB	Repl. by AAIJ 13AR
	[30] AALTONEN	12D	CDF	Repl. by AALTONEN 12AJ
	[31] AALTONEN	08G	CDF	Repl. by AALTONEN 12D
$28\ ^{+12}_{-15}\ ^{+4}_{-1}$	[20,32] ABAZOV	08AM	D0	Repl. by ABAZOV 12D
$39.5 \pm 28.0\ ^{+0.5}_{-7.0}$	[33,34] ABAZOV	07	D0	Repl. by ABAZOV 07N
$35\ ^{+20}_{-24}$	[34,35] ABAZOV	07N	D0	Repl. by ABAZOV 08AM

[1] AAIJ 25A reports $\phi_s = -2\,\beta_s = -0.086 \pm 0.106 \pm 0.028$ rad. in a time-dependent fit to $B^0_s \to D^+_s D^-_s$, while allowing CP violation in decay.

[2] AAIJ 19Q reports $\phi_s = -2\,\beta_s = -0.039 \pm 0.022 \pm 0.006$ rad. measured using a time-dependent angular analysis of $B^0_s \to J/\psi K^+ K^-$ decays.

[3] Reports a combination of $0.0435 \pm 0.0180 \pm 0.0105$ with AAD 16AP.

[4] AAD 21AE measured $\phi_s = -2\,\beta_s = -0.087 \pm 0.036 \pm 0.021$ rad. using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[5] AAIJ 21AN measured $\phi_s = -2\beta_s = 0.00 \pm 0.28 \pm 0.07$ rad, using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays with $J/\psi \to e^+ e^-$.

[6] Reports a combination of $0.0105 \pm 0.0220 \pm 0.0050$ with KHACHATRYAN 16S.

[7] SIRUNYAN 21E measured $\phi_s = -2\,\beta_s = -0.021 \pm 0.044 \pm 0.010$ rad. using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[8] Reports a combination of $-0.001 \pm 0.022 \pm 0.006$ with AAIJ 14S.

[9] AAIJ 19AF reports $\phi_s = -2\,\beta_s = 0.002 \pm 0.044 \pm 0.012$ rad. and $|\lambda| = 0.949 \pm 0.036 \pm 0.019$, when direct CP violation is allowed. Measured using a time-dependent fit to $B^0_s \to J/\psi\pi^+\pi^-$ decays.

[10] Measured $\phi_s = -2\,\beta_s = 0.119 \pm 0.107 \pm 0.034$ rad using time-dependent angular analysis of $B^0_s \to J/\psi K^+ K^-$ in the region m$(K K) > 1.05$ GeV.

[11] Reports a combination of $0.0435 \pm 0.0180 \pm 0.0105$ with AAD 14U.

[12] AAD 16AP reports $\phi_s = -2\,\beta_s = -0.090 \pm 0.078 \pm 0.041$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[13] AAIJ 16AK reports $\phi_s = -2\,\beta_s = 0.23^{+0.29}_{-0.28} \pm 0.02$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to \psi(2S)\phi$ decays.

[14] KHACHATRYAN 16S reports $\phi_s = -2\,\beta_s = -0.075 \pm 0.097 \pm 0.031$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[15] AAIJ 15I reports $\phi_s = -2\,\beta_s = -0.058 \pm 0.049 \pm 0.006$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to J/\psi K^+ K^-$ decays. It also combines this result with that of AAIJ 14S and quotes $\phi_s = -2\,\beta_s = -0.010 \pm 0.039$ rad.

[16] AAD 14U reports $\phi_s = -2\,\beta_s = 0.12 \pm 0.25 \pm 0.05$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[17] AAIJ 14AY reports $\phi_s = -2\,\beta_s = 0.02 \pm 0.17 \pm 0.02$ rad. in a time-dependent fit to $B^0_s \to D^+_s D^-_s$, while allowing CP violation in decay.

[18] AAIJ 14S reports $\phi_s = -2\,\beta_s = 0.070 \pm 0.068 \pm 0.008$ rad. and $|\lambda| = 0.89 \pm 0.05 \pm 0.01$, when direct CP violation is allowed. Measured using a time-dependent fit to $B^0_s \to J/\psi\pi^+\pi^-$ decays.

[19] AALTONEN 12AJ reports $-\pi/2 < \beta_s < -1.51$ or $-0.06 < \beta_s < 0.30$, or $1.26 < \beta_s < \pi/2$ rad. at 68% CL. Measured using the time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays.

[20] ABAZOV 12D reports $\phi_s = -2\,\beta_s = -0.55^{+0.38}_{-0.36}$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to J/\psi\phi$ decays. A single error includes both statistical and systematic uncertainties.

[21] AAIJ 19Q reports $\phi_s = -2\,\beta_s = -0.083 \pm 0.041 \pm 0.006$ rad. that was measured using a time-dependent angular analysis of $B^0_s \to J/\psi K^+ K^-$ decays.

[22] AAIJ 18S reports $\phi_s = -2\ \beta_s = -0.10 \pm 0.13 \pm 0.14$ rad measured in $B_s^0 \to (K^+\pi^-)(K^-\pi^+)$ in the region $0.75 < \mathrm{m}(K^\pm\pi^\mp) < 1.6$ GeV. This is a $b \to d\overline{d}s$ transition with a decay amplitude phase different from that of $b \to c\overline{c}s$ transition.

[23] AAIJ 15K reports $-2\beta_s = -0.12^{+0.14}_{-0.16}$ rad. The value was obtained by measuring time-dependent CP asymmetry in $B_s^0 \to K^+K^-$ and using a U-spin relation between $B_s^0 \to K^+K^-$ and $B^0 \to \pi^+\pi^-$.

[24] Results are also presented using additional inputs on $B^0 \to \pi^0\pi^0$ and $B^+ \to \pi^+\pi^0$ decays from other experiments and isospin symmetry assumptions. The dependence of the results on the maximum allowed amount of U-spin breaking up to 50% is also included.

[25] AAIJ 13AR reports $\phi_s = -2\beta_s = 0.01 \pm 0.07 \pm 0.01$ rad. obtained from combined fit to $B_s^0 \to J/\psi K^+K^-$ and $B_s^0 \to J/\psi\pi^+\pi^-$ data sets. Also reports separate results of $\phi_s = 0.07 \pm 0.09 \pm 0.01$ rad. from $B_s^0 \to J/\psi K^+K^-$ decays and $\phi_s = -0.14^{+0.17}_{-0.16} \pm 0.01$ rad. from $B_s^0 \to J/\psi\pi^+\pi^-$ decays.

[26] AAD 12CV reports $\phi_s = -2\ \beta_s = 0.22 \pm 0.41 \pm 0.10$ rad. that was measured using a time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

[27] Reports $\phi_s = -2\ \beta_s = -0.44 \pm 0.44 \pm 0.02$ rad. that was measured using a time-dependent fit to $B_s^0 \to J/\psi f_0(980)$ decays.

[28] Reports $\phi_s = -2\ \beta_s = 0.15 \pm 0.18 \pm 0.06$ rad. that was measured using a time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

[29] Reports $\phi_s = -2\ \beta_s = -0.019^{+0.173}_{-0.174}{}^{+0.004}_{-0.003}$ rad. which was measured using a time-dependent fit to $B_s^0 \to J/\psi\pi^+\pi^-$ decays, with the $\pi^+\pi^-$ mass within 775–1550 MeV. Searches for, but finds no evidence, for direct CP violation in $B_s^0 \to J/\psi\pi\pi$ decays.

[30] Reports $0.02 < \phi_s < 0.52$ or $1.08 < \phi_s < 1.55$ rad. at 68% C.L. confidence regions in the two-dimensional space of ϕ_s and $\Delta\Gamma_{B_s^0}$ from $B_s^0 \to J/\psi\phi$ decays.

[31] Reports $0.32 < 2\beta_s < 2.82$ rad. at 68% C.L. and confidence regions in the two-dimensional space of $2\beta_s$ and $\Delta\Gamma$ from the first measurement of $B_s^0 \to J/\psi\phi$ decays using flavor tagging. The probability of a deviation from SM prediction as large as the level of observed data is 15%.

[32] Reports $\phi_s = -2\ \beta_s$ and obtains 90% CL interval $-0.03 < \beta_s < 0.60$ rad.

[33] The first direct measurement of the CP-violating mixing phase is reported from the time-dependent analysis of flavor untagged $B_s^0 \to J/\psi\phi$ decays.

[34] Reports ϕ_s which equals to $-2\beta_s$.

[35] Combines D0 collaboration measurements of time-dependent angular distributions in $B_s^0 \to J/\psi\phi$ and charge asymmetry in semileptonic decays. There is a 4-fold ambiguity in the solution.

CP Violation phase β_s ($b \to s\overline{s}s$)

VALUE (10^{-2} rad)	DOCUMENT ID		TECN	COMMENT
3.7 ±3.5	[1,2] AAIJ	23AT	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.1 ±3.8±0.5	[3] AAIJ	23AT	LHCB	pp at 13 TeV
3.7 ±5.8±1.4	[4,5] AAIJ	19AP	LHCB	Repl. by AAIJ 23AT
8.5 ±7.5±1.5	[6] AAIJ	14AE	LHCB	Repl. by AAIJ 19AP
0.38 to 1.23	[7] AAIJ	13AY	LHCB	Repl. by AAIJ 14AE

[1] AAIJ 23AT reports $\phi_s^{s\overline{s}s} = -0.074 \pm 0.069$ rad and $|\lambda| = 1.009 \pm 0.030$. Measured using a time-dependent fit to $B_s^0 \to \phi\phi$ decays, assuming independence of the helicity of the $\phi\phi$ decay.
[2] AAIJ 23AT also reports polarisation-dependent results assuming that the longitudinal weak phase is CP-conserving and that there is no direct CP violation.
[3] Measured using a time-dependent fit to $B_s^0 \to \phi\phi$ decays, assuming independence of the helicity of the $\phi\phi$ decay.
[4] AAIJ 19AP reports $\phi_s^{s\overline{s}s} = -0.073 \pm 0.115 \pm 0.027$ rad and $|\lambda| = 0.99 \pm 0.05 \pm 0.01$. Measured using a time-dependent fit to $B_s^0 \to \phi\phi$ decays, assuming independence of the helicity of the $\phi\phi$ decay.
[5] AAIJ 19AP reports also polarisation-dependent results assuming that the longitudinal weak phase is CP-conserving and that there is no direct CP violation, giving $\phi_{s,\|}^{s\overline{s}s} = 0.014 \pm 0.055 \pm 0.011$ rad and $\phi_{s,\perp}^{s\overline{s}s} = 0.044 \pm 0.059 \pm 0.019$ rad.
[6] AAIJ 14AE value measured in $B_s^0 \to \phi\phi$ decays. Also reports $\phi_s^{s\overline{s}s} = -0.17 \pm 0.15 \pm 0.03$ rad.
[7] AAIJ 13AY uses $B_s^0 \to \phi\phi$ mode, and reports the 68% CL interval of $\phi_s^{s\overline{s}s} = -2\,\beta_s^{s\overline{s}s}$ as $[-2.46, -0.76]$ rad.

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.988±0.009 OUR AVERAGE				
0.990±0.010	AAIJ	24A	LHCB	pp at 7, 8, 13 TeV
0.972±0.026±0.008	[1] SIRUNYAN	21E	CMS	pp at 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.877^{+0.112}_{-0.116}\pm0.031$	AAIJ	21AN	LHCB	Repl. by AAIJ 24A
1.012±0.016±0.006	AAIJ	19Q	LHCB	Repl. by AAIJ 24A
0.964±0.019±0.007	AAIJ	15I	LHCB	Repl. by AAIJ 24A
0.93 ±0.03 ±0.02	AAIJ	13AR	LHCB	Repl. by AAIJ 15I

[1] Measured using time-dependent angular analysis of $B_s^0 \to J/\psi\phi$ decays.

$|\lambda|$ ($b \to c\overline{c}s$)

$\lambda = $ q/p$\cdot A_f/\overline{A}_f$ is a phase-convention-independent observable quantity for the final state f. See the review on "CP Violation in the Quark Sector" for details.

VALUE	DOCUMENT ID		TECN	COMMENT
0.989±0.008 OUR AVERAGE				
1.145±0.126±0.031	[1] AAIJ	25A	LHCB	pp at 13 TeV
0.990±0.010	[2] AAIJ	24A	LHCB	pp at 7, 8, 13 TeV
0.972±0.026±0.008	[3] SIRUNYAN	21E	CMS	pp at 13 TeV
0.949±0.036±0.019	[4] AAIJ	19AF	LHCB	pp at 7, 8, 13 TeV
0.994±0.018±0.006	[5] AAIJ	17V	LHCB	pp at 7, 8 TeV
$1.045^{+0.069}_{-0.050}\pm0.007$	[6] AAIJ	16AK	LHCB	pp at 7, 8 TeV
$0.91\ ^{+0.18}_{-0.15}\ \pm0.02$	[1] AAIJ	14AY	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.004±0.030±0.009	[7] AAIJ	23AT	LHCB	pp at 13 TeV
1.009±0.030	[7] AAIJ	23AT	LHCB	pp at 7, 8 and 13 TeV
$0.877^{+0.112}_{-0.116}\pm0.031$	AAIJ	21AN	LHCB	Repl. by AAIJ 24A
0.99 ±0.05 ±0.01	[7] AAIJ	19AP	LHCB	Repl. by AAIJ 23AT

$1.012 \pm 0.016 \pm 0.006$	AAIJ	19Q	LHCB	Repl. by AAIJ 24A
$1.035 \pm 0.034 \pm 0.089$	[8] AAIJ	18S	LHCB	pp at 7, 8 TeV
$0.964 \pm 0.019 \pm 0.007$	AAIJ	15I	LHCB	Repl. by AAIJ 24A
$1.04 \pm 0.07 \pm 0.03$	[7] AAIJ	14AE	LHCB	Repl. by AAIJ 19AP
$0.93 \pm 0.03 \pm 0.02$	AAIJ	13AR	LHCB	Repl. by AAIJ 15I

[1] Measured in $B_s^0 \to D_s^+ D_s^-$ decays.
[2] Measured using time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ in the region m(KK) in the vicinity of the $\phi(1020)$ resonance.
[3] Measured using time-dependent angular analysis of $B_s^0 \to J/\psi \phi$ decays.
[4] Measured using time-dependent analysis of $B_s^0 \to J/\psi \pi^+ \pi^-$ decays.
[5] Measured using time-dependent angular analysis of $B_s^0 \to J/\psi K^+ K^-$ in the region m(KK) > 1.05 GeV.
[6] Measured using time-dependent angular analysis of $B_s^0 \to \psi(2S) \phi$ decays.
[7] Measured in $B_s^0 \to \phi\phi$ decays.
[8] Measured in $B_s^0 \to (K^+ \pi^-)(K^- \pi^+)$ in the region $0.75 < $ m($K^\pm \pi^\mp$) < 1.6 GeV.

A, *CP* violation parameter

A $= -2\,\mathrm{Re}(\lambda) / (1 + |\lambda|^2)$

VALUE	DOCUMENT ID		TECN	COMMENT
-0.79 ± 0.08 OUR AVERAGE				
$-0.83 \pm 0.05 \pm 0.09$	[1] AAIJ	21O	LHCB	pp at 13 TeV
$-0.79 \pm 0.07 \pm 0.10$	[1] AAIJ	18O	LHCB	pp at 7, 8 TeV
$0.49^{+0.77}_{-0.65} \pm 0.06$	[2] AAIJ	15AL	LHCB	pp at 7, 8 TeV

[1] Measured in $B_s^0 \to K^+ K^-$ decays.
[2] Measured in $B_s^0 \to J/\psi K_S^0$ decays.

C, *CP* violation parameter

C $= (1 - |\lambda|^2) / (1 + |\lambda|^2)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.19 ± 0.06 OUR AVERAGE				
$0.20 \pm 0.06 \pm 0.02$	[1] AAIJ	18O	LHCB	pp at 7, 8 TeV
$-0.28 \pm 0.41 \pm 0.08$	[2] AAIJ	15AL	LHCB	pp at 7, 8 TeV

[1] Measured in $B_s^0 \to K^+ K^-$ decays.
[2] Measured in $B_s^0 \to J/\psi K_S^0$ decays.

S, *CP* violation parameter

S $= -2\,\mathrm{Im}(\lambda) / (1 + |\lambda|^2)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.17 ± 0.06 OUR AVERAGE				
$0.18 \pm 0.06 \pm 0.02$	[1] AAIJ	18O	LHCB	pp at 7, 8 TeV
$-0.08 \pm 0.40 \pm 0.08$	[2] AAIJ	15AL	LHCB	pp at 7, 8 TeV

[1] Measured in $B_s^0 \to K^+ K^-$ decays.
[2] Measured in $B_s^0 \to J/\psi K_S^0$ decays.

$A^L_{CP}(B_s \to J/\psi \overline{K}^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
$-0.048 \pm 0.057 \pm 0.020$	AAIJ	15AV	LHCB	pp at 7, 8 TeV

$A^{\parallel}_{CP}(B_s \to J/\psi \overline{K}^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.171±0.152±0.028	AAIJ	15AV	LHCB	pp at 7, 8 TeV

$A^{\perp}_{CP}(B_s \to J/\psi \overline{K}^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.049±0.096±0.025	AAIJ	15AV	LHCB	pp at 7, 8 TeV

$A_{CP}(B_s \to \pi^+ K^-)$

A_{CP} is defined as

$$\frac{B(\overline{B}^0_s \to f) - B(B^0_s \to \overline{f})}{B(\overline{B}^0_s \to f) + B(B^0_s \to \overline{f})},$$

the CP-violation asymmetry of exclusive B^0_s and $\overline{B}^0_s$ decay.

VALUE	DOCUMENT ID		TECN	COMMENT
0.224±0.012 OUR AVERAGE				
0.236±0.013±0.011	AAIJ	21O	LHCB	pp at 13 TeV
0.213±0.015±0.007	AAIJ	18O	LHCB	pp at 7, 8 TeV
0.22 ±0.07 ±0.02	AALTONEN	14P	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.27 ±0.04 ±0.01	AAIJ	13AX	LHCB	Repl. by AAIJ 18O
0.27 ±0.08 ±0.02	AAIJ	12V	LHCB	Repl. by AAIJ 13AX
0.39 ±0.15 ±0.08	AALTONEN	11N	CDF	Repl. by AALTONEN 14P

$A_{CP}(B^0_s \to [K^+ K^-]_D \overline{K}^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.062±0.032±0.021	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.04 ±0.07 ±0.02	AAIJ	14BN	LHCB	Repl. by AAIJ 24M
0.04 ±0.16 ±0.01	AAIJ	13L	LHCB	Repl. by AAIJ 14BN

$A_{CP}(B^0_s \to [\pi^+ K^-]_D K^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.009±0.011±0.020	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.01 ±0.03 ±0.02	AAIJ	14BN	LHCB	Repl. by AAIJ 24M

$A_{CP}(B^0_s \to [K^+ \pi^-]_D \overline{K}^*(892)^0)$

$A_{CP}(B^0_s \to [\pi^+ \pi^-]_D K^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.001±0.056±0.021	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.06 ±0.13 ±0.02	AAIJ	14BN	LHCB	Repl. by AAIJ 24M

$A_{CP}(B^0_s \to [K^+ \pi^- \pi^+ \pi^-]_D \overline{K}^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.029±0.012±0.021	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$A_{CP}(B_s^0 \to [K^-\pi^+\pi^+\pi^-]_D \overline{K}^*(892)^0)$

$A_{CP}(B_s^0 \to [\pi^+\pi^-\pi^+\pi^-]_D \overline{K}^*(892)^0)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.017±0.044±0.022	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$R_s^+ = \Gamma(B_s^0 \to [\pi^-K^+]_D \overline{K}^{*0}) / \Gamma(B_s^0 \to [\pi^+K^-]_D \overline{K}^{*0})$

VALUE	DOCUMENT ID		TECN	COMMENT
0.004±0.002±0.006	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$R_s^- = \Gamma(\overline{B}_s^0 \to [\pi^+K^-]_D K^{*0}) / \Gamma(\overline{B}_s^0 \to [\pi^-K^+]_D K^{*0})$

VALUE	DOCUMENT ID		TECN	COMMENT
0.004±0.002±0.006	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$R_s^+ = \Gamma(B_s^0 \to [\pi^-K^+\pi^+\pi^-]_D \overline{K}^{*0}) / \Gamma(B_s^0 \to [\pi^+K^-\pi^+\pi^-]_D \overline{K}^{*0})$

VALUE	DOCUMENT ID		TECN	COMMENT
0.019±0.004±0.007	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$R_s^- = \Gamma(\overline{B}_s^0 \to [\pi^+K^-\pi^+\pi^-]_D K^{*0}) / \Gamma(\overline{B}_s^0 \to [\pi^-K^+\pi^+\pi^-]_D K^{*0})$

VALUE	DOCUMENT ID		TECN	COMMENT
0.015±0.004±0.007	AAIJ	24M	LHCB	pp at 7, 8, 13 TeV

$S(B_s^0 \to \phi\gamma)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.43±0.30±0.11	[1] AAIJ	19AE	LHCB	pp at 7, 8 TeV

[1] Measured in flavor tagged time dependent analysis.

$C(B_s^0 \to \phi\gamma)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.11±0.29±0.11	[1] AAIJ	19AE	LHCB	pp at 7, 8 TeV

[1] Measured in flavor tagged time dependent analysis.

$A^{\Delta}(B_s^0 \to \phi\gamma)$

$A^{\Delta}(B_s \to \phi\gamma)$ is the multiplicative coefficient of the sinh($\Delta\Gamma$t/2) term in the $B_s \to \phi\gamma$ decay rate time dependence.

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{-0.67^{+0.37}_{-0.41}\pm0.17}$	[1] AAIJ	19AE	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$-0.98^{+0.46}_{-0.52}{}^{+0.23}_{-0.20}$	[2] AAIJ	17B	LHCB	Repl. by AAIJ 19AE

[1] Measured in flavor tagged time dependent analysis, using tagged and un-tagged events. This result updates AAIJ 17B with better selection efficiency and other analysis improvements.

[2] Measured in time dependent analysis without initial flavor tagging.

CPT VIOLATION PARAMETERS

In the B_s^0 mixing, propagating mass eigenstates can be written as

$$|B_{sL}\rangle \propto \mathrm{p}\,\sqrt{1-\xi}\,|B_s^0\rangle + \mathrm{q}\,\sqrt{1+\xi}\,|\overline{B}_s^0\rangle$$
$$|B_{sH}\rangle \propto \mathrm{p}\,\sqrt{1+\xi}\,|B_s^0\rangle - \mathrm{q}\,\sqrt{1-\xi}\,|\overline{B}_s^0\rangle$$

where parameter ξ controls *CPT* violation. If ξ is zero, then *CPT* is conserved. The parameter ξ can be written as

$$\xi = \frac{2(M_{11}-M_{22})-i(\Gamma_{11}-\Gamma_{22})}{-2\Delta m_s+i\Delta\Gamma_s} \approx \frac{-2\beta^{\mu}\Delta a_{\mu}}{2\Delta m_s-i\Delta\Gamma_s},$$

where M_{ii}, Γ_{ii}, Δm_s, and $\Delta\Gamma_s$ are parameters of Hamiltonian governing B_s oscillations, β^{μ} is the B_s^0 meson velocity and Δa_{μ} characterizes Lorentz-invariance violation.

$\Delta a_{\perp}$

VALUE (10^{-12} GeV)	*CL%*	*DOCUMENT ID*		*TECN*	*COMMENT*
$-0.47\pm0.39\pm0.08$		[1] AAIJ	16E	LHCB	pp at 7, 8 TeV
$<$ **1.2**	95	[2] ABAZOV	15L	D0	$p\overline{p}$ at 1.96 TeV

[1] Uses $B_s^0 \to J/\psi K^+ K^-$ decays.

[2] Measured in semileptonic $B_s^0 \to D_s^- \mu^+ X$ decays. Also extracts limit on time and longitudinal components ($-0.8 < \Delta a_T - 0.396\ \Delta a_Z < 3.9$) 10^{-13} GeV.

$\Delta a_{\parallel}$

VALUE (10^{-14} GeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$-0.89\pm1.41\pm0.36$	[1] AAIJ	16E	LHCB	pp at 7, 8 TeV

[1] Uses $B_s^0 \to J/\psi K^+ K^-$ decays.

Δa_X

VALUE (10^{-14} GeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$+1.01\pm2.08\pm0.71$	[1] AAIJ	16E	LHCB	pp at 7, 8 TeV

[1] Uses $B_s^0 \to J/\psi K^+ K^-$ decays.

Δa_Y

VALUE (10^{-14} GeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$-3.83\pm2.09\pm0.71$	[1] AAIJ	16E	LHCB	pp at 7, 8 TeV

[1] Uses $B_s^0 \to J/\psi K^+ K^-$ decays.

Re(ξ)

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
$-0.022\pm0.033\pm0.003$	[1] AAIJ	16E	LHCB	pp at 7, 8 TeV

[1] Uses $B_s^0 \to J/\psi K^+ K^-$ decays.

Im(ξ)

VALUE	*DOCUMENT ID*		*TECN*	*COMMENT*
$0.004\pm0.011\pm0.002$	[1] AAIJ	16E	LHCB	pp at 7, 8 TeV

[1] Uses $B_s^0 \to J/\psi K^+ K^-$ decays.

PARTIAL BRANCHING FRACTIONS IN $B_s \to \phi \ell^+ \ell^-$

B($B_s \to \phi \ell^+ \ell^-$) ($0.1 < q^2 < 2.0$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.14 ±0.16 OUR AVERAGE				
$1.11\ ^{+0.14}_{-0.13}\ \pm0.09$	[1] AAIJ	15AQ	LHCB	pp at 7, 8 TeV
$2.78\ \pm0.95\ \pm0.89$	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.897\ ^{+0.207}_{-0.186}\ \pm0.097$	[1] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $B^0_s \to \phi \mu^+ \mu^-$ decays.

B($B^0_s \to \phi \ell^+ \ell^-$) ($0.1 < q^2 < 0.98$ GeV^2/c^4)

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
6.81±0.47±0.34	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B^0_s \to \phi \mu^+ \mu^-$ decays

B($B^0_s \to \phi \ell^+ \ell^-$) ($1.1 < q^2 < 2.5$ GeV^2/c^4)

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
4.41±0.41±0.24	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B^0_s \to \phi \mu^+ \mu^-$ decays

B($B_s \to \phi \ell^+ \ell^-$) ($2.0 < q^2 < 5.0$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.77 ±0.12 ±0.06	[1] AAIJ	15AQ	LHCB	pp at 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.529\ ^{+0.182}_{-0.159}\ \pm0.057$	[1,2] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ
$0.58\ \pm0.55\ \pm0.19$	[2] AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

[1] Measured in $B^0_s \to \phi \mu^+ \mu^-$ decays.

[2] Measured in $2<q^2<4.3$ GeV^2/c^4.

B($B^0_s \to \phi \ell^+ \ell^-$) ($2.5 < q^2 < 4.0$ GeV^2/c^4)

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
3.51±0.39±0.18	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B^0_s \to \phi \mu^+ \mu^-$ decays

B($B^0_s \to \phi \ell^+ \ell^-$) ($4.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
6.22±0.48±0.32	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B^0_s \to \phi \mu^+ \mu^-$ decays

B($B_s \to \phi \ell^+ \ell^-$) ($5.0 < q^2 < 8.0$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.96±0.13±0.08	[1] AAIJ	15AQ	LHCB	pp at 7, 8 TeV

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

$1.38^{+0.25}_{-0.23}\pm0.14$	[1,2] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ
$1.34\pm0.83\pm0.43$	[2] AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

[1] Measured in $B^0_s \to \phi\mu^+\mu^-$ decays.
[2] Measured in $4.3<q^2<8.68$ GeV^2/c^4.

B($B^0_s \to \phi\ell^+\ell^-$) (6.0 < q^2 < 8.0 GeV^2/c^4)

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
6.30±0.48±0.32	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B^0_s \to \phi\mu^+\mu^-$ decays

B($B_s \to \phi\ell^+\ell^-$) (11.0 < q^2 < 12.5 GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.717±0.045±0.036	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.71\pm0.10\pm0.06$	[1] AAIJ	15AQ	LHCB	Repl. by AAIJ 21AG
$1.18^{+0.22}_{-0.21}\pm0.14$	[1,2] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ
$2.98\pm0.95\pm0.95$	[2] AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

[1] Measured in $B^0_s \to \phi\mu^+\mu^-$ decays.
[2] Measured in $10.9<q^2<12.86$ GeV^2/c^4.

B($B^0_s \to \phi\ell^+\ell^-$) (15.0 < q^2 < 19.0 GeV^2/c^4)

VALUE (units 10^{-8})	DOCUMENT ID		TECN	COMMENT
18.52±0.80±1.00	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV

[1] Measured in $B^0_s \to \phi\mu^+\mu^-$ decays

B($B_s \to \phi\ell^+\ell^-$) (15.0 < q^2 < 17.0 GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.050±0.058±0.054	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.90\pm0.11\pm0.07$	[1] AAIJ	15AQ	LHCB	Repl. by AAIJ 21AG
$0.760^{+0.189}_{-0.169}\pm0.087$	[1,2] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ
$1.86\pm0.66\pm0.59$	[2] AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

[1] Measured in $B^0_s \to \phi\mu^+\mu^-$ decays.
[2] Measured in $14.18<q^2<16$ GeV^2/c^4.

B($B_s \to \phi\ell^+\ell^-$) (17.0 < q^2 < 19.0 GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
0.838±0.058±0.046	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.79\pm0.11\pm0.07$	[1] AAIJ	15AQ	LHCB	Repl. by AAIJ 21AG
$1.06^{+0.23}_{-0.21}\pm0.12$	[1,2] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ
$2.32\pm0.76\pm0.74$	[2] AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

[1] Measured in $B^0_s \to \phi\mu^+\mu^-$ decays.
[2] Measured in $16<q^2<19$ GeV^2/c^4.

B($B_s \to \phi \ell^+ \ell^-$) ($1.0 < q^2 < 6.0$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
1.44 ±0.11 OUR AVERAGE				
1.440±0.075±0.075	[1] AAIJ	21AG	LHCB	pp at 7, 8, 13 TeV
1.14 ±0.79 ±0.36	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.29 ±0.16 ±0.10	[1] AAIJ	15AQ	LHCB	Repl. by AAIJ 21AG
1.14 $^{+0.25}_{-0.23}$ ±0.13	[1] AAIJ	13X	LHCB	Repl. by AAIJ 15AQ

[1] Measured in $B_s^0 \to \phi \mu^+ \mu^-$ decays.

B($B_s \to \phi \ell^+ \ell^-$) ($0.0 < q^2 < 4.3$ GeV^2/c^4)

VALUE (units 10^{-7})	DOCUMENT ID		TECN	COMMENT
3.30±1.09±1.05	AALTONEN	11AI	CDF	$p\overline{p}$ at 1.96 TeV

PRODUCTION ASYMMETRIES

A$_P$(B_s^0)

$A_P(B_s^0) = [\sigma(\overline{B}_s^0) - \sigma(B_s^0)] / [\sigma(\overline{B}_s^0) + \sigma(B_s^0)]$

VALUE (units 10^{-2})	DOCUMENT ID		TECN	COMMENT
1.2 ±1.6 OUR AVERAGE				
−0.65±2.88±0.59	[1] AAIJ	17BF	LHCB	pp at 7 TeV
1.98±1.90±0.59	[1] AAIJ	17BF	LHCB	pp at 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.09±2.61±0.66	[2] AAIJ	14BP	LHCB	Repl. by AAIJ 17BF, pp at 7 TeV

[1] Based on time-dependent analysis of $B_s^0 \to D_s^- \pi^+$ in kinematic range $2 < p_T < 30$ GeV/c and $2.1 < \eta < 4.5$.

[2] Based on time-dependent analysis of $B_s^0 \to D_s^- \pi^+$ in kinematic range $4 < p_T < 30$ GeV/c and $2.5 < \eta < 4.5$.

$B_s^0 \to D_s^{*-} \ell^+ \nu_\ell$ FORM FACTORS

ρ^2 (form factor slope)

VALUE	DOCUMENT ID		TECN	COMMENT
1.17±0.08 OUR AVERAGE				
1.16±0.05±0.07	[1] AAIJ	20AW	LHCB	pp at 13 TeV
1.23±0.17±0.05	[2] AAIJ	20E	LHCB	pp at 7,8 TeV

[1] The $B_s^0 \to D_s^{*-} \mu^+ \nu_\mu$ decay is reconstructed through the decays of $D_s^{*-} \to D_s^- \gamma$, $D_s^- \to K^- K^+ \pi^-$.

[2] The $B_s^0 \to D_s^{*-} \mu^+ \nu_\mu$ decay is reconstructed inclusively without γ from the decays of $D_s^{*-} \to D_s^- \gamma$, $D_s^- \to K^- K^+ \pi^-$.

B_s^0 REFERENCES

AAIJ	25A	JHEP 2501 061	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24A	PRL 132 051802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24AK	PR D110 072014	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24F	JHEP 2402 032	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24M	JHEP 2405 025	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24O	JHEP 2405 253	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24Q	JHEP 2407 101	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	24S	JHEP 2408 093	R. Aaij *et al.*	(LHCb Collab.)
ALONSO-ALV...	24	EPJ C84 553	G. Alonso-Alvarez, M.E. Abenza	(MCGI, TNTO+)
HAYRAPETY...	24AX	JHEP 2410 247	A. Hayrapetyan *et al.*	(CMS Collab.)
KUMAR	24	PR D109 032007	D. Kumar *et al.*	(BELLE Collab.)
AAD	23BY	JHEP 2309 199	G. Aad *et al.*	(ATLAS Collab.)
AAIJ	23AD	PRL 131 091901	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23AP	JHEP 2307 084	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23AT	PRL 131 171802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23AY	JHEP 2310 106	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23AZ	JHEP 2310 123	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23G	JHEP 2306 073	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23J	JHEP 2307 119	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23P	EPJ C83 629	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23T	PR D108 012007	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	23Y	PR D108 012021	R. Aaij *et al.*	(LHCb Collab.)
BORAH	23	PR D107 L051101	J. Borah *et al.*	(BELLE Collab.)
NAYAK	23	JHEP 2308 178	M. Nayak *et al.*	(BELLE Collab.)
TUMASYAN	23A	PL B842 137955	A. Tumasyan *et al.*	(CMS Collab.)
ZHUKOVA	23	JHEP 2308 131	V. Zhukova *et al.*	(BELLE Collab.)
AAIJ	22	PRL 128 041801	R. Aaij *et al.*	(LHCb Collab.)
Also		PR D105 012010	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	22B	NATP 18 1	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	22N	PR D105 072005	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	22Q	JHEP 2203 109	R. Aaij *et al.*	(LHCb Collab.)
BHUYAN	22	PR D105 012007	B. Bhuyan *et al.*	(BELLE Collab.)
PANG	22	PR D106 L051103	T. Pang *et al.*	(BELLE Collab.)
TUMASYAN	22AI	EPJ C82 499	A. Tumasyan *et al.*	(CMS Collab.)
WANG	22	PR D105 012004	B. Wang *et al.*	(BELLE Collab.)
AAD	21AE	EPJ C81 342	G. Aad *et al.*	(ATLAS Collab.)
AAIJ	21AG	PRL 127 151801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21AK	JHEP 2111 043	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21AN	EPJ C81 1026	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21C	JHEP 2102 024	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21G	PRL 126 081804	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21M	JHEP 2103 137	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21N	JHEP 2103 099	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21O	JHEP 2103 075	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21S	JHEP 2106 177	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	21Y	PR D104 032005	R. Aaij *et al.*	(LHCb Collab.)
DUBEY	21	PR D104 012007	S. Dubey *et al.*	(BELLE Collab.)
NISAR	21	PR D104 L031101	N.K. Nisar *et al.*	(BELLE Collab.)
SIRUNYAN	21E	PL B816 136188	A.M. Sirunyan *et al.*	(CMS Collab.)
AAIJ	20AW	JHEP 2012 144	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	20E	PR D101 072004	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	20F	PR D102 012011	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	20W	PRL 124 211802	R. Aaij *et al.*	(LHCb Collab.)
PDG	20	PTEP 2020 083C01	P.A. Zyla *et al.*	(PDG Collab.)
SIRUNYAN	20AG	JHEP 2004 188	A.M. Sirunyan *et al.*	(CMS Collab.)
SIRUNYAN	20BB	PRL 125 152001	A.M. Sirunyan *et al.*	(CMS Collab.)
AABOUD	19L	JHEP 1904 098	M. Aaboud *et al.*	(ATLAS Collab.)
AAIJ	19AE	PRL 123 081802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19AF	PL B797 134789	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19AK	PRL 123 211801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19AP	JHEP 1912 155	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19K	JHEP 1906 114	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19L	JHEP 1907 032	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19Q	EPJ C79 706	R. Aaij *et al.*	(LHCb Collab.)
Also		EPJ C80 601 (errat.)	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	19U	PRL 122 191804	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18AB	JHEP 1807 020	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18AC	JHEP 1808 191	R. Aaij *et al.*	(LHCb Collab.)

AAIJ	18AY	PR D98 071103	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18AZ	PR D98 072006	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18O	PR D98 032004	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18S	JHEP 1803 140	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18T	JHEP 1803 078	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	18U	JHEP 1803 059	R. Aaij *et al.*	(LHCb Collab.)
SIRUNYAN	18BY	EPJ C78 457	A.M. Sirunyan *et al.*	(CMS Collab.)
AAIJ	17A	PR D95 012006	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17AI	PRL 118 191801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17AJ	PRL 118 251802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17AL	PRL 119 041802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17AN	PRL 119 101801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17B	PRL 118 021801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17BA	JHEP 1705 158	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17BB	EPJ C77 609	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17BD	PR D96 051103	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17BF	PL B774 139	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17BJ	PRL 119 232001	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17BP	JHEP 1711 027	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17G	PRL 118 081801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17N	JHEP 1703 001	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17U	JHEP 1707 021	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	17V	JHEP 1708 037	R. Aaij *et al.*	(LHCb Collab.)
AABOUD	16L	EPJ C76 513	M. Aaboud *et al.*	(ATLAS Collab.)
AAD	16AP	JHEP 1608 147	G. Aad *et al.*	(ATLAS Collab.)
AAIJ	16	JHEP 1601 012	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16AK	PL B762 253	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16AL	PL B762 484	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16C	PRL 116 161802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16E	PRL 116 241601	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16G	PRL 117 061803	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16L	PL B760 117	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16P	PR D93 092008	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	16U	JHEP 1603 040	R. Aaij *et al.*	(LHCb Collab.)
ABAZOV	16C	PR D94 012001	V.M. Abazov *et al.*	(D0 Collab.)
KHACHATRY...	16Q	PL B756 84	V. Khachatryan *et al.*	(CMS Collab.)
KHACHATRY...	16S	PL B757 97	V. Khachatryan *et al.*	(CMS Collab.)
PAL	16	PRL 116 161801	B. Pal *et al.*	(BELLE Collab.)
AAIJ	15AC	JHEP 1505 019	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15AD	JHEP 1506 130	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15AF	JHEP 1507 166	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15AG	JHEP 1508 005	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15AL	JHEP 1506 131	R. Aaji *et al.*	(LHCb Collab.)
AAIJ	15AQ	JHEP 1509 179	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15AS	JHEP 1510 053	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15AV	JHEP 1511 082	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15BB	PR D92 112002	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15D	JHEP 1501 024	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15I	PRL 114 041801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15K	PL B741 1	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15O	PRL 115 051801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15S	PL B743 46	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	15U	PL B747 484	R. Aaij *et al.*	(LHCb Collab.)
ABAZOV	15A	PRL 114 062001	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	15L	PRL 115 161601	V.M. Abazov *et al.*	(D0 Collab.)
DUTTA	15	PR D91 011101	D. Dutta *et al.*	(BELLE Collab.)
KHACHATRY...	15BE	NAT 522 68	V. Khachatryan *et al.*	(CMS and LHCb Collab.)
OSWALD	15	PR D92 072013	C. Oswald *et al.*	(BELLE Collab.)
AAD	14U	PR D90 052007	G. Aad *et al.*	(ATLAS Collab.)
AAIJ	14AA	PRL 112 202001	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14AE	PR D90 052011	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14AX	PRL 113 172001	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14AY	PRL 113 211801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14BF	JHEP 1411 060	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14BH	PR D90 072003	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14BM	NJP 16 123001	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14BN	PR D90 112002	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14BP	PL B739 218	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14BR	PR D89 092006	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14D	PL B728 607	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14E	JHEP 1404 114	R. Aaij *et al.*	(LHCb Collab.)

AAIJ	14F	PRL 112 111802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14L	JHEP 1407 140	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14R	PL B736 446	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14S	PL B736 186	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	14Y	PRL 112 091802	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	14P	PRL 113 242001	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	14	PR D89 012002	V.M. Abazov *et al.*	(D0 Collab.)
PDG	14	CP C38 070001	K. Olive *et al.*	(PDG Collab.)
AAIJ	13	NP B867 1	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13A	NP B867 547	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AA	NP B871 403	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AB	NP B873 275	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AC	NP B874 663	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AL	PR D87 071101	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AN	PR D87 072004	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AP	PR D87 092007	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AQ	PR D87 112009	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AR	PR D87 112010	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AW	PRL 110 211801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AX	PRL 110 221601	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13AY	PRL 110 241802	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13B	PRL 110 021801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BA	PRL 111 101805	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BI	NJP 15 053021	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BM	PRL 111 141801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BO	JHEP 1310 183	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BP	JHEP 1310 143	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BQ	JHEP 1310 005	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BW	JHEP 1311 092	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13BX	PL B727 403	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13CF	EPJ C73 2655	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13L	JHEP 1303 067	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13X	JHEP 1307 084	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	13Z	JHEP 1309 006	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	13F	PR D87 072003	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	13	PRL 110 011801	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	13C	PR D87 072006	V.M. Abazov *et al.*	(D0 Collab.)
CHATRCHYAN	13AW	PRL 111 101804	S. Chatrchyan *et al.*	(CMS Collab.)
ESEN	13	PR D87 031101	S. Esen *et al.*	(BELLE Collab.)
OSWALD	13	PR D87 072008	C. Oswald *et al.*	(BELLE Collab.)
Also		PR D90 119901 (errat.)	C. Oswald *et al.*	(BELLE Collab.)
SOLOVIEVA	13	PL B726 206	E. Solovieva *et al.*	(BELLE Collab.)
THORNE	13	PR D88 114006	F. Thorne *et al.*	(BELLE Collab.)
AAD	12AE	PL B713 387	G. Aad *et al.*	(ATLAS Collab.)
AAD	12CV	JHEP 1212 072	G. Aad *et al.*	(ATLAS Collab.)
AAIJ	12	PL B707 349	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12A	PL B708 55	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AE	PR D85 112013	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AG	JHEP 1206 115	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AM	PRL 109 131801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AN	PRL 109 152002	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AO	PR D86 052006	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AP	PR D86 071102	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AR	JHEP 1210 037	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12AX	PR D86 112005	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12B	PL B707 497	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12D	PRL 108 101803	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12E	PL B708 241	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12F	PL B709 50	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12I	PL B709 177	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12L	EPJ C72 2118	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12O	PL B713 172	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12P	PL B713 369	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12Q	PL B713 378	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12R	PL B716 393	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12S	PRL 108 151801	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12V	PRL 108 201601	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	12W	PRL 108 231801	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	12AJ	PRL 109 171802	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	12C	PRL 108 201801	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	12D	PR D85 072002	T. Aaltonen *et al.*	(CDF Collab.)

AALTONEN	12L	PRL 108 211803	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	12AF	PR D86 092011	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	12C	PR D85 011103	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	12D	PR D85 032006	V.M. Abazov *et al.*	(D0 Collab.)
CHATRCHYAN	12A	JHEP 1204 033	S. Chatrchyan *et al.*	(CMS Collab.)
LEES	12A	PR D85 011101	J.P. Lees *et al.*	(BABAR Collab.)
LI	12	PRL 108 181808	J. Li *et al.*	(BELLE Collab.)
PDG	12	PR D86 010001	J. Beringer *et al.*	(PDG Collab.)
AAIJ	11	PL B698 115	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	11A	PL B698 14	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	11B	PL B699 330	R. Aaij *et al.*	(LHCb Collab.)
AAIJ	11D	PL B706 32	R. Aaij	(LHCb Collab.)
AAIJ	11E	PR D84 092001	R. Aaij *et al.*	(LHCb Collab.)
Also		PR D85 039904 (errat.)	R. Aaij *et al.*	(LHCb Collab.)
AALTONEN	11A	PR D83 052012	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11AB	PR D84 052012	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11AG	PRL 107 191801	T. Aaltonen *et al.*	(CDF Collab.)
Also		PRL 107 239903 (errat.)	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11AI	PRL 107 201802	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11AN	PRL 107 261802	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11AP	PRL 107 272001	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11L	PRL 106 161801	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	11N	PRL 106 181802	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	11U	PR D84 052007	V.M. Abazov *et al.*	(D0 Collab.)
CHATRCHYAN	11T	PRL 107 191802	S. Chatrchyan *et al.*	(CMS Collab.)
LI	11	PRL 106 121802	J. Li *et al.*	(BELLE Collab.)
ABAZOV	10E	PR D82 012003	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	10H	PRL 105 081801	V.M. Abazov *et al.*	(D0 Collab.)
Also		PR D82 032001	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	10S	PL B693 539	V.M. Abazov *et al.*	(D0 Collab.)
ESEN	10	PRL 105 201802	S. Esen *et al.*	(BELLE Collab.)
LOUVOT	10	PRL 104 231801	R. LOUVOT *et al.*	(BELLE Collab.)
PENG	10	PR D82 072007	C.-C. Peng *et al.*	(BELLE Collab.)
AALTONEN	09AQ	PRL 103 191802	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	09B	PR D79 011104	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	09C	PRL 103 031801	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	09P	PRL 102 201801	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	09E	PRL 102 032001	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	09G	PRL 102 051801	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	09I	PRL 102 091801	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	09Y	PR D79 111102	V.M. Abazov *et al.*	(D0 Collab.)
LOUVOT	09	PRL 102 021801	R. Louvot *et al.*	(BELLE Collab.)
AALTONEN	08F	PRL 100 021803	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	08G	PRL 100 161802	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	08J	PRL 100 121803	T. Aaltonen *et al.*	(CDF Collab.)
ABAZOV	08AM	PRL 101 241801	V.M. Abazov *et al.*	(D0 Collab.)
WICHT	08A	PRL 100 121801	J. Wicht *et al.*	(BELLE Collab.)
ABAZOV	07	PRL 98 121801	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	07A	PRL 98 151801	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	07N	PR D76 057101	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	07Y	PRL 99 241801	V.M. Abazov *et al.*	(D0 Collab.)
ABULENCIA	07C	PRL 98 061802	A. Abulencia *et al.*	(CDF Collab.)
DRUTSKOY	07	PRL 98 052001	A. Drutskoy *et al.*	(BELLE Collab.)
DRUTSKOY	07A	PR D76 012002	A. Drutskoy *et al.*	(BELLE Collab.)
ABAZOV	06B	PRL 97 021802	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	06G	PR D74 031107	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	06V	PRL 97 241801	V.M. Abazov *et al.*	(D0 Collab.)
ABULENCIA	06J	PRL 96 191801	A. Abulencia *et al.*	(CDF Collab.)
ABULENCIA	06N	PRL 96 231801	A. Abulencia *et al.*	(CDF Collab.)
ABULENCIA	06Q	PRL 97 062003	A. Abulencia *et al.*	(CDF Collab.)
ABULENCIA,A	06D	PRL 97 211802	A. Abulencia *et al.*	(CDF Collab.)
ABULENCIA,A	06G	PRL 97 242003	A. Abulencia *et al.*	(CDF Collab.)
ACOSTA	06	PRL 96 202001	D. Acosta *et al.*	(CDF Collab.)
ABAZOV	05B	PRL 94 042001	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	05W	PRL 95 171801	V.M. Abazov *et al.*	(D0 Collab.)
ACOSTA	05	PRL 94 101803	D. Acosta *et al.*	(CDF Collab.)
ACOSTA	05J	PRL 95 031801	D. Acosta *et al.*	(CDF Collab.)
ABDALLAH	04A	PL B585 63	J. Abdallah *et al.*	(DELPHI Collab.)
ABDALLAH	04J	EPJ C35 35	J. Abdallah *et al.*	(DELPHI Collab.)
ABDALLAH	03B	EPJ C28 155	J. Abdallah *et al.*	(DELPHI Collab.)
ABE	03	PR D67 012006	K. Abe *et al.*	(SLD Collab.)

HEISTER	03E	EPJ C29 143	A. Heister *et al.*	(ALEPH Collab.)
ABE	02V	PR D66 032009	K. Abe *et al.*	(SLD Collab.)
ACOSTA	02D	PR D65 111101	D. Acosta *et al.*	(CDF Collab.)
ACOSTA	02G	PR D66 112002	D. Acosta *et al.*	(CDF Collab.)
ABBIENDI	01D	EPJ C19 241	G. Abbiendi *et al.*	(OPAL Collab.)
BARATE	01E	EPJ C19 213	R. Barate *et al.*	(ALEPH Collab.)
ABE	00C	PR D62 071101	K. Abe *et al.*	(SLD Collab.)
ABREU	00Y	EPJ C16 555	P. Abreu *et al.*	(DELPHI Collab.)
ABREU,P	00G	EPJ C18 229	P. Abreu *et al.*	(DELPHI Collab.)
AFFOLDER	00N	PRL 85 4668	T. Affolder *et al.*	(CDF Collab.)
BARATE	00K	PL B486 286	R. Barate *et al.*	(ALEPH Collab.)
ABBIENDI	99S	EPJ C11 587	G. Abbiendi *et al.*	(OPAL Collab.)
ABE	99D	PR D59 032004	F. Abe *et al.*	(CDF Collab.)
ABE	99J	PRL 82 3576	F. Abe *et al.*	(CDF Collab.)
BARATE	99J	EPJ C7 553	R. Barate *et al.*	(ALEPH Collab.)
Also		EPJ C12 181 (errat.)	R. Barate *et al.*	(ALEPH Collab.)
ABE	98B	PR D57 5382	F. Abe *et al.*	(CDF Collab.)
ABE	98V	PRL 81 5742	F. Abe *et al.*	(CDF Collab.)
ACCIARRI	98S	PL B438 417	M. Acciarri *et al.*	(L3 Collab.)
ACKERSTAFF	98F	EPJ C2 407	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	98G	PL B426 161	K. Ackerstaff *et al.*	(OPAL Collab.)
BARATE	98C	EPJ C4 367	R. Barate *et al.*	(ALEPH Collab.)
BARATE	98Q	EPJ C4 387	R. Barate *et al.*	(ALEPH Collab.)
PDG	98	EPJ C3 1	C. Caso *et al.*	(PDG Collab.)
ACCIARRI	97B	PL B391 474	M. Acciarri *et al.*	(L3 Collab.)
ACCIARRI	97C	PL B391 481	M. Acciarri *et al.*	(L3 Collab.)
ACKERSTAFF	97U	ZPHY C76 401	K. Ackerstaff *et al.*	(OPAL Collab.)
ACKERSTAFF	97V	ZPHY C76 417	K. Ackerstaff *et al.*	(OPAL Collab.)
ADAM	97	PL B414 382	W. Adam *et al.*	(DELPHI Collab.)
ABE	96B	PR D53 3496	F. Abe *et al.*	(CDF Collab.)
ABE	96N	PRL 77 1945	F. Abe *et al.*	(CDF Collab.)
ABE	96Q	PR D54 6596	F. Abe *et al.*	(CDF Collab.)
ABREU	96F	ZPHY C71 11	P. Abreu *et al.*	(DELPHI Collab.)
ADAM	96D	ZPHY C72 207	W. Adam *et al.*	(DELPHI Collab.)
BUSKULIC	96E	ZPHY C69 585	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	96M	PL B377 205	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	96V	PL B384 471	D. Buskulic *et al.*	(ALEPH Collab.)
PDG	96	PR D54 1	R. M. Barnett *et al.*	(PDG Collab.)
ABE	95R	PRL 74 4988	F. Abe *et al.*	(CDF Collab.)
ABE	95Z	PRL 75 3068	F. Abe *et al.*	(CDF Collab.)
ACCIARRI	95H	PL B363 127	M. Acciarri *et al.*	(L3 Collab.)
ACCIARRI	95I	PL B363 137	M. Acciarri *et al.*	(L3 Collab.)
AKERS	95G	PL B350 273	R. Akers *et al.*	(OPAL Collab.)
AKERS	95J	ZPHY C66 555	R. Akers *et al.*	(OPAL Collab.)
BUSKULIC	95J	PL B356 409	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	95O	PL B361 221	D. Buskulic *et al.*	(ALEPH Collab.)
ABREU	94D	PL B324 500	P. Abreu *et al.*	(DELPHI Collab.)
ABREU	94E	ZPHY C61 407	P. Abreu *et al.*	(DELPHI Collab.)
Also		PL B289 199	P. Abreu *et al.*	(DELPHI Collab.)
AKERS	94J	PL B337 196	R. Akers *et al.*	(OPAL Collab.)
AKERS	94L	PL B337 393	R. Akers *et al.*	(OPAL Collab.)
BUSKULIC	94B	PL B322 441	D. Buskulic *et al.*	(ALEPH Collab.)
BUSKULIC	94C	PL B322 275	D. Buskulic *et al.*	(ALEPH Collab.)
ABE	93F	PRL 71 1685	F. Abe *et al.*	(CDF Collab.)
ACTON	93H	PL B312 501	P.D. Acton *et al.*	(OPAL Collab.)
BUSKULIC	93G	PL B311 425	D. Buskulic *et al.*	(ALEPH Collab.)
ABREU	92M	PL B289 199	P. Abreu *et al.*	(DELPHI Collab.)
ACTON	92N	PL B295 357	P.D. Acton *et al.*	(OPAL Collab.)
BUSKULIC	92E	PL B294 145	D. Buskulic *et al.*	(ALEPH Collab.)
LEE-FRANZINI	90	PRL 65 2947	J. Lee-Franzini *et al.*	(CUSB II Collab.)