Heavy FLavor AVeraging group (HFLAV) - May 2018
Measurements of the longitudinal polarization fraction (f_L) in B^+ decays

Mode	PDG2017 Avg.	BABAR		Belle		Our Avg.
ωK^{*+}	0.41 ± 0.19	$0.41 \pm 0.18 \pm 0.05$	[1]			0.41 ± 0.19
$\omega K_2^*(1430)^+$	0.56 ± 0.11	$0.56 \pm 0.10 \pm 0.04$	[1]			0.56 ± 0.11
$K^{*+}\overline{K}^{*0}$	$0.82^{+0.15}_{-0.21}$	$0.75^{+0.16}_{-0.26} \pm 0.03$	[2]	$1.06 \pm 0.30 \pm 0.14$	[3]	$0.82^{+0.13}_{-0.18}$
ϕK^{*+}	0.50 ± 0.05	$0.49 \pm 0.05 \pm 0.03$	[4]	$0.52 \pm 0.08 \pm 0.03$	[5]	0.50 ± 0.05
$\phi K_1(1270)^+$	0.46 ± 0.14	$0.46^{+0.12+0.06}_{-0.13-0.07}$	[6]			$0.46^{+0.13}_{-0.15}$
$\phi K_2^*(1430)^+$	0.80 ± 0.10	$0.80^{+0.09}_{-0.10} \pm 0.03$	[6]			0.80 ± 0.10
$K^{*+}\rho^0$	0.78 ± 0.12	$0.78 \pm 0.12 \pm 0.03$	[7]			0.78 ± 0.12
$K^{*0}\rho^+$	0.48 ± 0.08	$0.52 \pm 0.10 \pm 0.04$	[8]	$0.43 \pm 0.11^{+0.05}_{-0.02}$	[9]	0.48 ± 0.08
$\rho^+\rho^0$	0.950 ± 0.016	$0.950 \pm 0.015 \pm 0.006$	[10]	$0.95 \pm 0.11 \pm 0.02$	[11]	0.950 ± 0.016
$\omega\rho^+$	0.90 ± 0.06	$0.90 \pm 0.05 \pm 0.03$	[1]			0.90 ± 0.06
$p\bar{p}K^{*+}$	0.32 ± 0.19			$0.32 \pm 0.17 \pm 0.09$	[12]	0.32 ± 0.19

Heavy FLavor AVeraging group (HFLAV) - May 2018
Measurements of the longitudinal polarization fraction (f_L) in B^0 decays

Mode	PDG2017 Avg.	BABAR		Belle		LHCb		Our Avg.
ωK^{*0}	0.69 ± 0.13	$0.72 \pm 0.14 \pm 0.02$	[1]	$0.56 \pm 0.29^{+0.18}_{-0.08}$	[13]			0.70 ± 0.13
$\omega K_2^*(1430)^0$	0.45 ± 0.12	$0.45 \pm 0.12 \pm 0.02$	[1]					0.45 ± 0.12
$K^{*0}\overline{K}^{*0}$	$0.80^{+0.12}_{-0.13}$	$0.80^{+0.10}_{-0.12} \pm 0.06$	[14]					$0.80^{+0.12}_{-0.13}$
ϕK^{*0}	0.497 ± 0.017	$0.494 \pm 0.034 \pm 0.013$	[15]	$0.499 \pm 0.030 \pm 0.018$	[16]	$0.497 \pm 0.019 \pm 0.015$	[17]	0.497 ± 0.017
$\phi K_2^*(1430)^0$	$0.913^{+0.029}_{-0.050}$	$0.901^{+0.046}_{-0.058} \pm 0.037$	[15]	$0.918^{+0.029}_{-0.060} \pm 0.012$	[16]			$0.913^{+0.029}_{-0.048}$
$K^{*0}\rho^0$	0.40 ± 0.14	$0.40 \pm 0.08 \pm 0.11$	[18]					0.40 ± 0.14
$K^{*+}\rho^-$	0.38 ± 0.13	$0.38 \pm 0.13 \pm 0.03$	[18]					0.38 ± 0.13
$\rho^+\rho^-$	$0.990^{+0.021}_{-0.019}$	$0.992 \pm 0.024^{+0.026}_{-0.013}$	[19]	$0.988 \pm 0.012 \pm 0.023$	[20]			$0.990^{+0.021}_{-0.018}$
$\rho^0\rho^0$	$0.71^{+0.08}_{-0.09}$	$0.75^{+0.11}_{-0.14} \pm 0.05$	[21]	$0.21^{+0.18}_{-0.22} \pm 0.15$	[22]	$0.745^{+0.048}_{-0.058} \pm 0.034$	[23]	$0.714^{+0.055}_{-0.062}$
$a_1^+a_1^-$	0.31 ± 0.24	$0.31 \pm 0.22 \pm 0.10$	[24]					0.31 ± 0.24
$p\bar{p}K^{*0}$	1.01 ± 0.13			$1.01 \pm 0.13 \pm 0.03$	[12]			1.01 ± 0.13
$\lambda\bar{\lambda}K^{*0}$	0.60 ± 0.23			$0.60 \pm 0.22 \pm 0.08$	[25]			0.60 ± 0.23
$K^{*0}e^+e^-$	0.16 ± 0.07					$0.16 \pm 0.06 \pm 0.03$ †	[25]	0.16 ± 0.07

† $0.002 < q^2 < 1.120 \ GeV^2/c^4$

Heavy FLavor AVeraging group (HFLAV) - May 2018
Full angular analysis of $B^+ \to \phi K^{*+}$

Parameter	PDG2017 Avg.	BABAR	Belle	Our Avg.
$f_\perp = \Lambda_{\perp\perp}$	0.20 ± 0.05	$0.21 \pm 0.05 \pm 0.02$[4]	$0.19 \pm 0.08 \pm 0.02$[5]	0.20 ± 0.05
$\phi_\parallel$	2.34 ± 0.18	$2.47 \pm 0.20 \pm 0.07$	$2.10 \pm 0.28 \pm 0.04$	2.34 ± 0.17
$\phi_\perp$	2.58 ± 0.17	$2.69 \pm 0.20 \pm 0.03$	$2.31 \pm 0.30 \pm 0.07$	2.58 ± 0.17
δ_0	3.07 ± 19	$3.07 \pm 0.18 \pm 0.06$		3.07 ± 0.19
A_{CP}^0	0.17 ± 0.11	$0.17 \pm 0.11 \pm 0.02$		0.17 ± 0.11
$A_{CP}^\perp$	0.22 ± 0.25	$0.22 \pm 0.24 \pm 0.08$		0.22 ± 0.25
$\Delta\phi_\parallel$	0.07 ± 0.21	$0.07 \pm 0.20 \pm 0.05$		0.07 ± 0.21
$\Delta\phi_\perp$	0.19 ± 0.21	$0.19 \pm 0.20 \pm 0.07$		0.19 ± 0.21
$\Delta\delta_0$	0.20 ± 0.18	$0.20 \pm 0.18 \pm 0.03$		0.20 ± 0.18

Angles (ϕ, δ) are in radians. BF, f_L and A_{CP} are tabulated separately.

Heavy FLavor AVeraging group (HFLAV) - May 2018
Full angular analysis of $B^0 \to \phi K^{*0}$
Preliminary   Updated results not included in PDG Live as of Dec. 31, 2017

Parameter	PDG2017 Avg.	BABAR	Belle	LHCb	Our Avg.
$f_\perp = \Lambda_{\perp\perp}$	0.224 ± 0.015	$0.212 \pm 0.032 \pm 0.013$[15]	$0.238 \pm 0.026 \pm 0.008$[16]	$0.221 \pm 0.016 \pm 0.013$ [17]	0.225 ± 0.015
$f_S(K\pi)$				$0.143 \pm 0.013 \pm 0.012$	0.143 ± 0.018
$f_S(KK)$				$0.122 \pm 0.013 \pm 0.008$	0.122 ± 0.015
$\phi_\parallel$	2.43 ± 0.11	$2.40 \pm 0.13 \pm 0.08$	$2.23 \pm 0.10 \pm 0.02$	$2.562 \pm 0.069 \pm 0.040$	2.430 ± 0.058
$\phi_\perp$	2.53 ± 0.09	$2.35 \pm 0.13 \pm 0.09$	$2.37 \pm 0.10 \pm 0.04$	$2.633 \pm 0.062 \pm 0.037$	2.527 ± 0.056
δ_0	2.88 ± 0.10	$2.82 \pm 0.15 \pm 0.09$	$2.91 \pm 0.10 \pm 0.08$		2.88 ± 0.10
$\phi_S(K\pi)$ †				$2.222 \pm 0.063 \pm 0.081$	2.222 ± 0.103
$\phi_S(KK)$ †				$2.481 \pm 0.072 \pm 0.048$	2.481 ± 0.087
A_{CP}^0	-0.007 ± 0.030	$0.01 \pm 0.07 \pm 0.02$	$-0.03 \pm 0.06 \pm 0.01$	$-0.003 \pm 0.038 \pm 0.005$	-0.007 ± 0.030
$A_{CP}^\perp$	-0.02 ± 0.06	$-0.04 \pm 0.15 \pm 0.06$	$-0.14 \pm 0.11 \pm 0.01$	$0.047 \pm 0.072 \pm 0.009$	-0.014 ± 0.057
$\mathcal{A}_{CP}^S(K\pi)$				$0.073 \pm 0.091 \pm 0.035$	0.073 ± 0.097
$\mathcal{A}_{CP}^S(KK)$				$-0.209 \pm 0.105 \pm 0.012$	-0.209 ± 0.106
$\Delta\phi_\parallel$	0.05 ± 0.05	$0.22 \pm 0.12 \pm 0.08$	$-0.02 \pm 0.10 \pm 0.01$	$0.045 \pm 0.068 \pm 0.015$	0.051 ± 0.053
$\Delta\phi_\perp$	0.08 ± 0.05	$0.21 \pm 0.13 \pm 0.08$	$0.05 \pm 0.10 \pm 0.02$	$0.062 \pm 0.062 \pm 0.006$	0.075 ± 0.050
$\Delta\delta_0$	0.13 ± 0.09	$0.27 \pm 0.14 \pm 0.08$	$0.08 \pm 0.10 \pm 0.01$		0.13 ± 0.08
$\Delta\phi_S(K\pi)$ †				$0.062 \pm 0.062 \pm 0.022$	0.062 ± 0.066
$\Delta\phi_S(KK)$ †				$0.022 \pm 0.072 \pm 0.004$	0.022 ± 0.072

Angles (ϕ, δ) are in radians. BF, f_L and A_{CP} are tabulated separately.
† Original LHCb notation adapted to match similar existing quantities.

Heavy FLavor AVeraging group (HFLAV) - May 2018
Full angular analysis of $B^0 \to \phi K_2^{*0}(1430)$
Preliminary   Updated results not included in PDG Live as of Dec. 31, 2017

Parameter	PDG2017 Avg.	BABAR	Belle	Our Avg.
$f_\perp = \Lambda_{\perp\perp}$	$0.027^{+0.031}_{-0.025}$	$0.002^{+0.018}_{-0.002} \pm 0.031$ [15]	$0.056^{+0.050}_{-0.035} \pm 0.009$ [16]	$0.027^{+0.027}_{-0.024}$
$\phi_\parallel$	4.0 ± 0.4	$3.96 \pm 0.38 \pm 0.06$	$3.76 \pm 2.88 \pm 1.32$	3.96 ± 0.38
$\phi_\perp$	4.5 ± 0.4		$4.45^{+0.43}_{-0.38} \pm 0.13$	$4.45^{+0.45}_{-0.40}$
δ_0	3.46 ± 0.14	$3.41 \pm 0.13 \pm 0.13$	$3.53 \pm 0.11 \pm 0.19$	3.46 ± 0.14
A_{CP}^0	-0.03 ± 0.04	$-0.05 \pm 0.06 \pm 0.01$	$-0.016^{+0.066}_{-0.051} \pm 0.008$	$-0.032^{+0.043}_{-0.038}$
$A_{CP}^\perp$	$0.0^{+0.9}_{-0.7}$		$-0.01^{+0.85}_{-0.67} \pm 0.09$	$-0.01^{+0.85}_{-0.68}$
$\Delta\phi_\parallel$	-0.9 ± 0.4	$-1.00 \pm 0.38 \pm 0.09$	$-0.02 \pm 1.08 \pm 1.01$	-0.94 ± 0.38
$\Delta\phi_\perp$	-0.2 ± 0.4		$-0.19 \pm 0.42 \pm 0.11$	-0.19 ± 0.43
$\Delta\delta_0$	0.08 ± 0.09	$0.11 \pm 0.13 \pm 0.06$	$0.06 \pm 0.11 \pm 0.02$	0.08 ± 0.09

Angles (ϕ, δ) are in radians. BF, f_L and A_{CP} are tabulated separately.

Heavy FLavor AVeraging group (HFLAV) - May 2018
Measurements of the longitudinal polarization fraction (f_L) in B_s^0 decays
Preliminary   Updated results not included in PDG Live as of Dec. 31, 2017

Mode	PDG2017 Avg.	CDF	LHCb	Our Avg.
$\phi\phi$	0.362 ± 0.014	$0.348 \pm 0.041 \pm 0.021$[26]	$0.365 \pm 0.022 \pm 0.012$[27]	0.361 ± 0.022
$K^{*0}\overline{K}^{*0}$	0.20 ± 0.07		$0.201 \pm 0.057 \pm 0.040$[28]	0.201 ± 0.070
$\phi\overline{K}^{*0}$	0.51 ± 0.17		$0.51 \pm 0.15 \pm 0.07$ [29]	0.51 ± 0.17

Heavy FLavor AVeraging group (HFLAV) - May 2018
Full angular analysis of $B_s^0 \to \phi\phi$

Parameter	PDG2017 Avg.	CDF	LHCb	Our Avg.
$f_\perp = \Lambda_{\perp\perp}$	0.309 ± 0.015	$0.305 \pm 0.013 \pm 0.005[26]$	$0.291 \pm 0.024 \pm 0.010[30]$	0.302 ± 0.012
$\phi_\parallel$	2.55 ± 0.11	$2.71^{+0.31}_{-0.36} \pm 0.22$	$2.54 \pm 0.07 \pm 0.09$	2.55 ± 0.11
$\phi_\perp$	2.67 ± 0.24		$2.67 \pm 0.23 \pm 0.07$	2.67 ± 0.24

The parameter ϕ is in radians. BF, f_L and A_{CP} are tabulated separately.

Heavy FLavor AVeraging group (HFLAV) - May 2018
Full angular analysis of $B_s^0 \to \phi\overline{K}^{*0}$

Parameter	PDG2017 Avg.	LHCb	Our Avg.
f_L	0.51 ± 0.17	$0.51 \pm 0.15 \pm 0.07[29]$	0.51 ± 0.17
$f_\parallel$	0.21 ± 0.11	$0.21 \pm 0.11 \pm 0.02$	0.21 ± 0.11
$\phi_\parallel$ [†]	1.8 ± 0.6	$1.75^{+0.59+0.38}_{-0.53-0.30}$	$1.75^{+0.70}_{-0.61}$

The parameter ϕ is in radians. BF, f_L and A_{CP} are tabulated separately.
[†] Converted from the measurement of $\cos(\phi_\parallel)$. PDG takes the smallest resulting asymmetric error as parabolic.

Heavy FLavor AVeraging group (HFLAV) - May 2018
Full angular analysis of $B_s^0 \to K^{*0}\overline{K}^{*0}$

Parameter	PDG2017 Avg.	LHCb	Our Avg.
f_L	0.20 ± 0.07	$0.201 \pm 0.057 \pm 0.040[28]$	0.201 ± 0.070
$f_\perp$	0.38 ± 0.12	$0.38 \pm 0.11 \pm 0.004$	0.380 ± 0.110
$f_\parallel$	0.21 ± 0.05	$0.215 \pm 0.046 \pm 0.015$	0.215 ± 0.048
$|A_s^+|^2$		$0.114 \pm 0.037 \pm 0.023$	0.114 ± 0.044
$|A_s^-|^2$		$0.485 \pm 0.051 \pm 0.019$	0.485 ± 0.054
$|A_{ss}|^2$		$0.066 \pm 0.022 \pm 0.007$	0.066 ± 0.023
$\delta_\parallel$	5.31 ± 0.28	$5.31 \pm 0.24 \pm 0.14$	5.31 ± 0.28
$\delta_\perp - \delta_s^+$		$1.95 \pm 0.21 \pm 0.04$	1.95 ± 0.21
δ_s^-		$1.79 \pm 0.19 \pm 0.19$	1.79 ± 0.27
δ_{ss}		$1.06 \pm 0.27 \pm 0.23$	1.06 ± 0.35

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