

# Heavy Flavor Averaging Group - ICHEP 2016

## Compilation of $CP$ Asymmetries for $B^+$ modes

In PDG2014    **New since PDG2014 (preliminary)**    **New since PDG2014 (published)**

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CDF	LHCb	New Avg.
262	$K^0\pi^+$	$-0.017 \pm 0.016$	$-0.029 \pm 0.039 \pm 0.010$	$-0.011 \pm 0.021 \pm 0.006$		$-0.022 \pm 0.025 \pm 0.010$	$-0.017 \pm 0.016$
263	$K^+\pi^0$	$0.037 \pm 0.021$	$0.030 \pm 0.039 \pm 0.010$	$0.043 \pm 0.024 \pm 0.002$			$0.040 \pm 0.021$
264	$\eta'K^+$	$0.013 \pm 0.017$	$0.008^{+0.017}_{-0.018} \pm 0.009$	$0.028 \pm 0.028 \pm 0.021$			$0.013 \pm 0.017$
265	$\eta'K^{*+}$	$-0.26 \pm 0.27$	$-0.26 \pm 0.27 \pm 0.02$				$-0.26 \pm 0.27$
266	$\eta'K_0^*(1430)^+$	$0.06 \pm 0.20$	$0.06 \pm 0.20 \pm 0.02$				$0.06 \pm 0.20$
267	$\eta'K_2^*(1430)^+$	$0.15 \pm 0.13$	$0.15 \pm 0.13 \pm 0.02$				$0.15 \pm 0.13$
268	$\eta K^+$	$-0.37 \pm 0.08$	$-0.36 \pm 0.11 \pm 0.03$	$-0.38 \pm 0.11 \pm 0.01$			$-0.37 \pm 0.08$
269	$\eta K^{*+}$	$0.02 \pm 0.06$	$0.01 \pm 0.08 \pm 0.02$	$0.03 \pm 0.10 \pm 0.01$			$0.02 \pm 0.06$
270	$\eta K_0^*(1430)^+$	$0.05 \pm 0.13 \pm 0.02$	$0.05 \pm 0.13 \pm 0.02$				$0.05 \pm 0.13$
271	$\eta K_2^*(1430)^+$	$-0.45 \pm 0.30 \pm 0.02$	$-0.45 \pm 0.30 \pm 0.02$				$-0.45 \pm 0.30$
281	$\omega K^+$	$0.02 \pm 0.05$	$-0.01 \pm 0.07 \pm 0.01$	$-0.03 \pm 0.04 \pm 0.01$			$-0.02 \pm 0.04$
282	$\omega K^{*+}$	$0.29 \pm 0.35$	$0.29 \pm 0.35 \pm 0.02$				$0.29 \pm 0.35$
284	$\omega K_0^*(1430)^+$	$-0.10 \pm 0.09$	$-0.10 \pm 0.09 \pm 0.02$				$-0.10 \pm 0.09$
285	$\omega K_2^*(1430)^+$	$0.14 \pm 0.15$	$0.14 \pm 0.15 \pm 0.02$				$0.14 \pm 0.15$
288	$K^{*0}\pi^+$	$-0.04 \pm 0.09$	$0.032 \pm 0.052^{+0.016}_{-0.013}$	$-0.149 \pm 0.064 \pm 0.022$			$-0.038 \pm 0.042$
289	$K^{*+}\pi^0$	$-0.06 \pm 0.24$	$-0.06 \pm 0.24 \pm 0.04$				$-0.06 \pm 0.24$
290	$K^+\pi^+\pi^-$	$0.033 \pm 0.010$	$0.028 \pm 0.020 \pm 0.023$	$0.049 \pm 0.026 \pm 0.020$		$0.025 \pm 0.004 \pm 0.008$	$0.027 \pm 0.008$
293	$f_0(980)K^+$	$-0.08 \pm 0.09^\dagger$	$-0.106 \pm 0.050^{+0.036}_{-0.015}$	$-0.077 \pm 0.065^{+0.046}_{-0.026}$			$-0.095^{+0.049}_{-0.042}$
294	$f_2(1270)K^+$	$-0.68^{+0.19}_{-0.017}$	$-0.85 \pm 0.22^{+0.26}_{-0.13}$	$-0.59 \pm 0.22 \pm 0.04$			$-0.68^{+0.20}_{-0.18}$
295	$f_0(1370)K^+$	$0.28^{+0.30}_{-0.29}$	$0.28 \pm 0.26^{+0.15}_{-0.14}$				$0.28^{+0.30}_{-0.29}$
298	$\rho^0 K^+$	$0.37 \pm 0.10$	$0.44 \pm 0.10^{+0.06}_{-0.14}$	$0.30 \pm 0.11^{+0.11}_{-0.05}$			$0.37 \pm 0.11$
299	$K_0^*(1430)^0\pi^+$	$0.055 \pm 0.033$	$0.032 \pm 0.035^{+0.034}_{-0.028}$	$0.076 \pm 0.038^{+0.028}_{-0.022}$			$0.055^{+0.034}_{-0.032}$
300	$K_2^*(1430)^0\pi^+$	$0.05^{+0.29}_{-0.24}$	$0.05 \pm 0.23^{+0.18}_{-0.08}$				$0.05^{+0.29}_{-0.24}$
303	$K^+\pi^0\pi^0$	$-0.06 \pm 0.07$	$-0.06 \pm 0.06 \pm 0.04$				$-0.06 \pm 0.07$
310	$\rho^+K^0$	$-0.12 \pm 0.17$	$-0.12 \pm 0.17 \pm 0.02$				$-0.12 \pm 0.17$
311	$K^{*+}\pi^+\pi^-$	$0.07 \pm 0.08$	$0.07 \pm 0.07 \pm 0.04$				$0.07 \pm 0.08$
312	$K^{*+}\rho^0$	$0.31 \pm 0.13$	$0.31 \pm 0.13 \pm 0.03$				$0.31 \pm 0.13$
313	$f_0(980)K^{*+}$	$-0.15 \pm 0.12$	$-0.15 \pm 0.12 \pm 0.03$				$-0.15 \pm 0.12$
314	$a^+K^0$	$0.12 \pm 0.11$	$0.12 \pm 0.11 \pm 0.02$				$0.12 \pm 0.11$
315	$b_1^+K^0$	$-0.03 \pm 0.15$	$-0.03 \pm 0.15 \pm 0.02$				$-0.03 \pm 0.15$
312	$K^{*0}\rho^+$	$-0.01 \pm 0.16$	$-0.01 \pm 0.16 \pm 0.02$				$-0.01 \pm 0.16$
319	$b_1^0K^+$	$-0.46 \pm 0.20$	$-0.46 \pm 0.20 \pm 0.02$				$-0.46 \pm 0.20$
322	$K^+\bar{K}^0$	$0.04 \pm 0.14$	$0.10 \pm 0.26 \pm 0.03$	$0.014 \pm 0.168 \pm 0.002$		$-0.21 \pm 0.14 \pm 0.01$	$-0.087 \pm 0.100$
324	$K^+K_S K_S$	$0.04^{+0.04}_{-0.05}$	$0.04^{+0.04}_{-0.05} \pm 0.02$				$0.04^{+0.04}_{-0.05}$
329	$K^+K^-\pi^+$	$-0.12 \pm 0.05$	$0.00 \pm 0.10 \pm 0.03$			$-0.123 \pm 0.017 \pm 0.014$	$-0.118 \pm 0.022$
340	$K^+K^-K^+$	$-0.036 \pm 0.012$	$-0.017^{+0.019}_{-0.014} \pm 0.014$			$-0.036 \pm 0.004 \pm 0.007$	$-0.033 \pm 0.007$
341	$\phi K^+$	$0.04 \pm 0.04$	$0.128 \pm 0.044 \pm 0.013$	$0.01 \pm 0.12 \pm 0.05$	$-0.07 \pm 0.17^{+0.03}_{-0.02}$	$0.022 \pm 0.021 \pm 0.009$	$0.041 \pm 0.020$
348	$K^{*+}K^+K^-$	$0.11 \pm 0.09$	$0.11 \pm 0.08 \pm 0.03$				$0.11 \pm 0.09$
349	$\phi K^{*+}$	$-0.01 \pm 0.08$	$0.00 \pm 0.09 \pm 0.04$	$-0.02 \pm 0.14 \pm 0.03$			$-0.01 \pm 0.08$
351	$\phi K_1(1270)^+$	$0.15 \pm 0.20$	$0.15 \pm 0.19 \pm 0.05$				$0.15 \pm 0.20$
354	$\phi K_0^*(1430)^+$	$0.04 \pm 0.15$	$0.04 \pm 0.15 \pm 0.04$				$0.04 \pm 0.15$
355	$\phi K_2^*(1430)^+$	$-0.23 \pm 0.20$	$-0.23 \pm 0.19 \pm 0.06$				$-0.23 \pm 0.20$
359	$\phi\phi K^+$	$-0.10 \pm 0.08$	$-0.10 \pm 0.08$				$-0.10 \pm 0.08$
363	$K^{*+}\gamma$	$0.18 \pm 0.29$	$0.18 \pm 0.28 \pm 0.07$				$0.18 \pm 0.29$
365	$K^+\eta\gamma$	$-0.12 \pm 0.07$	$-0.09 \pm 0.10 \pm 0.01$	$-0.16 \pm 0.09 \pm 0.06$			$-0.12 \pm 0.07$
367	$K^+\phi\gamma$	$-0.13 \pm 0.11$	$-0.26 \pm 0.14 \pm 0.05$	$-0.03 \pm 0.11 \pm 0.08$			$-0.13 \pm 0.10$
378	$\rho^+\gamma$	$-0.11 \pm 0.33$		$-0.11 \pm 0.32 \pm 0.09$			$-0.11 \pm 0.33$
379	$\pi^+\pi^0$	$0.03 \pm 0.04$	$0.03 \pm 0.08 \pm 0.01$	$0.025 \pm 0.043 \pm 0.007$			$0.026 \pm 0.039$
380	$\pi^+\pi^-\pi^+$	$0.105 \pm 0.029$	$0.032 \pm 0.044^{+0.040}_{-0.037}$			$0.058 \pm 0.008 \pm 0.011$	$0.057 \pm 0.014$
381	$\rho^0\pi^+$	$0.18^{+0.09}_{-0.17}$	$0.18 \pm 0.07^{+0.040}_{-0.037}$				$0.18^{+0.09}_{-0.17}$
383	$f_2(1270)\pi^+$	$0.41^{+0.31}_{-0.29}$	$0.41 \pm 0.25^{+0.18}_{-0.15}$				$0.41^{+0.31}_{-0.29}$
384	$\rho(1450)^0\pi^+$	$-0.06^{+0.36}_{-0.42}$	$-0.06 \pm 0.28^{+0.23}_{-0.32}$				$-0.06^{+0.36}_{-0.42}$
385	$f_0(1370)\pi^+$	$0.72 \pm 0.22$	$0.72 \pm 0.15 \pm 0.16$				$0.72 \pm 0.22$
387	$\pi^+\pi^-\pi^+(NR)$	$-0.14^{+0.23}_{-0.16}$	$-0.14 \pm 0.14^{+0.18}_{-0.08}$				$-0.14^{+0.23}_{-0.16}$
389	$\rho^+\pi^0$	$0.02 \pm 0.11$	$-0.01 \pm 0.13 \pm 0.02$	$0.06 \pm 0.17^{+0.04}_{-0.05}$			$0.02 \pm 0.11$
391	$\rho^+\rho^0$	$-0.05 \pm 0.05$	$-0.054 \pm 0.055 \pm 0.010$	$0.00 \pm 0.22 \pm 0.03$			$-0.051 \pm 0.054$
397	$\eta\pi^+$	$-0.14 \pm 0.07$	$-0.03 \pm 0.09 \pm 0.03$	$-0.19 \pm 0.06 \pm 0.01$			$-0.14 \pm 0.05$
398	$\eta\rho^+$	$0.11 \pm 0.11$	$0.13 \pm 0.11 \pm 0.02$	$-0.04^{+0.34}_{-0.32} \pm 0.01$			$0.11 \pm 0.11$
399	$\eta'\pi^+$	$0.06 \pm 0.16$	$0.03 \pm 0.17 \pm 0.02$	$0.20^{+0.37}_{-0.36} \pm 0.04$			$0.06 \pm 0.15$
400	$\eta'\rho^+$	$0.26 \pm 0.17$	$0.26 \pm 0.17 \pm 0.02$				$0.26 \pm 0.17$
401	$\omega\pi^+$	$-0.04 \pm 0.06^1$	$-0.02 \pm 0.08 \pm 0.01$	$-0.02 \pm 0.09 \pm 0.01$			$-0.02 \pm 0.06$
402	$\omega\rho^+$	$-0.20 \pm 0.09$	$-0.20 \pm 0.09 \pm 0.02$				$-0.20 \pm 0.09$
408	$b_1^0\pi^+$	$0.05 \pm 0.16$	$0.05 \pm 0.16 \pm 0.02$				$0.05 \pm 0.16$
417	$p\bar{p}\pi^+$	$0.00 \pm 0.04$	$0.04 \pm 0.07 \pm 0.04$	$-0.17 \pm 0.10 \pm 0.02^\ddagger$			$-0.04 \pm 0.06$
420	$p\bar{p}K^+$	$-0.08 \pm 0.04$	$-0.16 \pm 0.08 \pm 0.04$	$-0.02 \pm 0.05 \pm 0.02^\ddagger$		$-0.047 \pm 0.036 \pm 0.007$	$-0.051 \pm 0.029$
425	$p\bar{p}K^{*+}$	$0.21 \pm 0.16$	$0.32 \pm 0.13 \pm 0.05$	$-0.01 \pm 0.19 \pm 0.02$			$0.21 \pm 0.11$
428	$p\bar{\Lambda}\gamma$	$0.17 \pm 0.17$		$0.17 \pm 0.16 \pm 0.05$			$0.17 \pm 0.17$
429	$p\bar{\Lambda}\pi^0$	$0.01 \pm 0.17$		$0.01 \pm 0.17 \pm 0.04$			$0.01 \pm 0.17$
471	$K^+\ell\ell$	$-0.02 \pm 0.08$	$-0.03 \pm 0.14 \pm 0.01^\S$	$0.04 \pm 0.10 \pm 0.02$			$0.02 \pm 0.08$
472	$K^+e^+e^-$	$0.14 \pm 0.14$		$0.14 \pm 0.14 \pm 0.03$			$0.14 \pm 0.14$
473	$K^+\mu^+\mu^-$	$-0.003 \pm 0.033$		$-0.05 \pm 0.13 \pm 0.03$		$0.012 \pm 0.017 \pm 0.001^2$	$0.011 \pm 0.017$
478	$K^{*+}\ell\ell$	$-0.09 \pm 0.14$	$0.01^{+0.26}_{-0.24} \pm 0.02$	$-0.13^{+0.17}_{-0.16} \pm 0.01$			$-0.09^{+0.14}_{-0.13}$
479	$K^{*+}e^+e^-$	$-0.14^{+0.23}_{-0.22}$		$-0.14^{+0.23}_{-0.22} \pm 0.02$			$-0.14^{+0.23}_{-0.22}$
480	$K^{*+}\mu^+\mu^-$	$-0.12 \pm 0.24$		$-0.12 \pm 0.24 \pm 0.02$		$-0.035 \pm 0.024 \pm 0.003^2$	$-0.036 \pm 0.024$
480	$\pi^+\mu^+\mu^-$					$-0.11 \pm 0.12 \pm 0.01$	$-0.11 \pm 0.12$

<sup>†</sup> PDG takes the value from the BABAR amplitude analysis of  $B^+ \rightarrow K^+K^-K^+$  decays, while our numbers are from amplitude analyses of  $B^+ \rightarrow K^+\pi^-\pi^+$ .

<sup>‡</sup> PDG swaps the BELLE results corresponding to  $A_{CP}(p\bar{p}\pi^+)$  and  $A_{CP}(p\bar{p}K^+)$ . <sup>1</sup> PDG uses also a result from CLEO.

<sup>§</sup> PDG uses also a previous result from BABAR ([12]); <sup>2</sup> LHCb also quotes results in bins of  $m(\ell^+\ell^-)^2$ .

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 Compilation of  $CP$  Asymmetries for  $B^0$  modes  
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RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CDF	LHCb	New Avg.
227	$K^+\pi^-$	$-0.082 \pm 0.006$ <sup>1</sup>	$-0.107 \pm 0.016^{+0.006}_{-0.004}$	$-0.069 \pm 0.014 \pm 0.007$	$-0.083 \pm 0.013 \pm 0.004$	$-0.080 \pm 0.007 \pm 0.003$	$-0.082 \pm 0.006$
230	$\eta' K^{*0}$	$0.02 \pm 0.23$	$0.02 \pm 0.23 \pm 0.02$	$-0.22 \pm 0.29 \pm 0.07$			$-0.07 \pm 0.18$
231	$\eta' K_0^*(1430)^0$	$-0.19 \pm 0.17$	$-0.19 \pm 0.17 \pm 0.02$				$-0.19 \pm 0.17$
232	$\eta' K_2^*(1430)^0$	$0.14 \pm 0.18$	$0.14 \pm 0.18 \pm 0.02$				$0.14 \pm 0.18$
234	$\eta K^{*0}$	$0.19 \pm 0.05$	$0.21 \pm 0.06 \pm 0.02$	$0.17 \pm 0.08 \pm 0.01$			$0.19 \pm 0.05$
235	$\eta K_0^*(1430)^0$	$0.06 \pm 0.13$	$0.06 \pm 0.13 \pm 0.02$				$0.06 \pm 0.13$
236	$\eta K_2^*(1430)^0$	$-0.07 \pm 0.19$	$-0.07 \pm 0.19 \pm 0.02$				$-0.07 \pm 0.19$
241	$b_1^- K^+$	$-0.07 \pm 0.12$	$-0.07 \pm 0.12 \pm 0.02$				$-0.07 \pm 0.12$
246	$\omega K^{*0}$	$0.45 \pm 0.25$	$0.45 \pm 0.25 \pm 0.02$				$0.45 \pm 0.25$
248	$\omega K_0^*(1430)^0$	$-0.07 \pm 0.09$	$-0.07 \pm 0.09 \pm 0.02$				$-0.07 \pm 0.09$
249	$\omega K_2^*(1430)^0$	$-0.37 \pm 0.17$	$-0.37 \pm 0.17 \pm 0.02$				$-0.37 \pm 0.17$
251	$K^+\pi^-\pi^0$	$0.00 \pm 0.06$	$-0.030^{+0.045}_{-0.051} \pm 0.055$	$0.07 \pm 0.11 \pm 0.01$			$0.000^{+0.059}_{-0.061}$
252	$\rho^- K^+$	$0.20 \pm 0.11$	$0.20 \pm 0.09 \pm 0.08$	$0.22^{+0.22+0.06}_{-0.23-0.02}$			$0.20 \pm 0.11$
253	$\rho(1450)^- K^+$	$-0.10 \pm 0.33$	$-0.10 \pm 0.32 \pm 0.09$				$-0.10 \pm 0.33$
254	$\rho(1700)^- K^+$	$-0.36 \pm 0.61$	$-0.36 \pm 0.57 \pm 0.23$				$-0.36 \pm 0.61$
255	$K^+\pi^-\pi^0(NR)$	$0.10 \pm 0.18$	$0.10 \pm 0.16 \pm 0.08$				$0.10 \pm 0.18$
257	$K_0^*(1430)^0 \pi^0$	$-0.15 \pm 0.11$	$-0.15 \pm 0.10 \pm 0.04$				$-0.15 \pm 0.11$
261	$K^0 \pi^+ \pi^-$	$-0.01 \pm 0.05$	$-0.01 \pm 0.05 \pm 0.01$				$-0.01 \pm 0.05$
264	$K^{*+} \pi^-$	$-0.22 \pm 0.06$ <sup>1</sup>	$-0.24 \pm 0.07 \pm 0.02$ <sup>2</sup>	$-0.21 \pm 0.11 \pm 0.07$			$-0.23 \pm 0.06$
265	$K_0^*(1430)^+ \pi^-$	$0.09 \pm 0.07$	$0.09 \pm 0.07 \pm 0.03$				$0.09 \pm 0.08$
271	$K^{*0} \pi^0$	$-0.15 \pm 0.13$	$-0.15 \pm 0.12 \pm 0.04$				$-0.15 \pm 0.13$
278	$K^{*0} \pi^+ \pi^-$	$0.07 \pm 0.05$	$0.07 \pm 0.04 \pm 0.03$				$0.07 \pm 0.05$
279	$K^{*0} \rho^0$	$-0.06 \pm 0.09$	$-0.06 \pm 0.09 \pm 0.02$				$-0.06 \pm 0.09$
280	$f_0(980) K^{*0}$	$0.07 \pm 0.10$	$0.07 \pm 0.10 \pm 0.02$				$0.07 \pm 0.10$
283	$a_1^- K^+$	$-0.16 \pm 0.12$	$-0.16 \pm 0.12 \pm 0.01$				$-0.16 \pm 0.12$
284	$K^{*+} \rho^-$	$0.21 \pm 0.15$	$0.21 \pm 0.15 \pm 0.02$				$0.21 \pm 0.15$
311	$K^{*0} K^+ K^-$	$0.01 \pm 0.05$	$0.01 \pm 0.05 \pm 0.02$				$0.01 \pm 0.05$
312	$\phi K^{*0}$	$0.00 \pm 0.04$	$0.01 \pm 0.06 \pm 0.03$	$-0.007 \pm 0.048 \pm 0.021$		$-0.015 \pm 0.032 \pm 0.10^\dagger$	$-0.003 \pm 0.038$
314	$K^{*0} \pi^+ K^-$	$0.22 \pm 0.39$	$0.22 \pm 0.33 \pm 0.20$				$0.22 \pm 0.39$
326	$\phi K_0^*(1430)^0$	$0.12 \pm 0.08$	$0.20 \pm 0.14 \pm 0.06$	$0.093 \pm 0.094 \pm 0.017$			$0.124 \pm 0.081$
333	$\phi K_2^*(1430)^0$	$-0.11 \pm 0.10$	$-0.08 \pm 0.12 \pm 0.05$	$-0.155^{+0.152}_{-0.133} \pm 0.033$			$-0.113^{+0.102}_{-0.096}$
340	$K^{*0} \gamma$	$-0.002 \pm 0.015$	$-0.016 \pm 0.022 \pm 0.007$			$0.008 \pm 0.017 \pm 0.009$	$-0.002 \pm 0.015$
357	$\pi^0 \pi^0$	$0.43 \pm 0.14$	$0.43 \pm 0.26 \pm 0.05$	$0.44^{+0.52}_{-0.53} \pm 0.17$			$0.43 \pm 0.24$
391	$a_1^\mp \pi^\pm$	$-0.07 \pm 0.06$	$-0.07 \pm 0.07 \pm 0.02$	$-0.06 \pm 0.05 \pm 0.07$			$-0.07 \pm 0.06$
400	$b_1^\mp \pi^\pm$	$-0.05 \pm 0.10$	$-0.05 \pm 0.10 \pm 0.02$				$-0.05 \pm 0.10$
412	$p\bar{p} K^{*0}$	$0.05 \pm 0.12$	$0.11 \pm 0.13 \pm 0.06$	$-0.08 \pm 0.20 \pm 0.02$			$0.05 \pm 0.12$
414	$p\bar{\Lambda} \pi^-$	$0.04 \pm 0.07$	$-0.10 \pm 0.10 \pm 0.02$ <sup>3</sup>	$-0.02 \pm 0.10 \pm 0.03$			$-0.06 \pm 0.07$
477	$K^{*0} \ell \ell$	$-0.05 \pm 0.10$	$0.02 \pm 0.20 \pm 0.02$	$-0.08 \pm 0.12 \pm 0.02$			$-0.05 \pm 0.10$
478	$K^{*0} e^+ e^-$	$-0.21 \pm 0.19$		$-0.21 \pm 0.19 \pm 0.02$			$-0.21 \pm 0.19$
479	$K^{*0} \mu^+ \mu^-$	$-0.07 \pm 0.04$		$0.00 \pm 0.15 \pm 0.03$		$-0.035 \pm 0.024 \pm 0.003^4$	$-0.034 \pm 0.024$

Measurements of time-dependent  $CP$  asymmetries are listed on the Unitarity Triangle home page. (<http://www.slac.stanford.edu/xorg/hfag/triangle/index.html>)

<sup>†</sup> Extracted from measured  $\Delta A_{CP} = A_{CP}(\phi K^{*0}) - A_{CP}(J/\psi K^{*0}) = 0.015 \pm 0.032 \pm 0.005$ .

<sup>1</sup> PDG uses also a result from CLEO.

<sup>2</sup> Average of BABAR results from  $B^0 \rightarrow K^+ \pi^- \pi^0$  and  $B^0 \rightarrow K^0 \pi^+ \pi^-$ .

<sup>3</sup> PDG quotes the opposite asymmetry.

<sup>4</sup> LHCb also quotes results in bins of  $m(\ell^+ \ell^-)^2$ .

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Compilation of  $CP$  Asymmetries for  $B^\pm/B^0$  Admixture

In PDG2014    New since PDG2014 (preliminary)    New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	New Avg.
65	$K^*\gamma$	$-0.003 \pm 0.017^\ddagger$	$-0.003 \pm 0.017 \pm 0.007$	$-0.015 \pm 0.044 \pm 0.012$	$-0.005 \pm 0.017$
77	$s\gamma$	$-0.008 \pm 0.029$	<span style="color: blue;"><math>0.017 \pm 0.019 \pm 0.010^{\S}</math></span>	$0.002 \pm 0.050 \pm 0.030$	$0.015 \pm 0.020$
	$(s+d)\gamma$	$-0.01 \pm 0.05$	$0.057 \pm 0.060 \pm 0.018^1$	<span style="color: red;"><math>0.022 \pm 0.039 \pm 0.009^*</math></span>	$0.032 \pm 0.034$
80	$s\eta$	$-0.13^{+0.04}_{-0.05}$		$-0.13 \pm 0.04^{+0.02}_{-0.03}$	$-0.13^{+0.04}_{-0.05}$
86	$\pi^+X$	$0.10 \pm 0.17$	$0.10 \pm 0.16 \pm 0.05$		$0.10 \pm 0.17$
121	$s\ell\ell$	$-0.22 \pm 0.26$	<span style="color: red;"><math>0.04 \pm 0.11 \pm 0.01</math></span>		$0.04 \pm 0.11$
126	$K^*e^+e^-$	$-0.18 \pm 0.15$		$-0.18 \pm 0.15 \pm 0.01$	$-0.18 \pm 0.15$
128	$K^*\mu^+\mu^-$	$-0.03 \pm 0.13$		$-0.03 \pm 0.13 \pm 0.02$	$-0.03 \pm 0.13$
129	$K\ell\ell$	New	<span style="color: red;"><math>-0.03 \pm 0.14 \pm 0.01</math></span>		$-0.03 \pm 0.14$
130	$K^*\ell\ell$	$-0.04 \pm 0.07$	$0.03 \pm 0.13 \pm 0.01^\ddagger$	$-0.10 \pm 0.10 \pm 0.01$	$-0.05 \pm 0.08$

<sup>§</sup> BABAR also measures the difference in direct  $CP$  asymmetry for charged and neutral  $B$  mesons:  $\Delta A_{CP} = +(5.0 \pm 3.9 \pm 1.5)\%$ .

<sup>†</sup> Previous BABAR result is also included in the PDG Average.

<sup>1</sup> There is another Babar result using the recoil method (Phys. Rev. D 77, 051103), and a CLEO result (Phys. Rev. Lett. 86, 5661) that are used in the PDG average

\* Require  $E_\gamma > 2.1\text{GeV}$ .

<sup>‡</sup> PDG include also a result from CLEO.

## Heavy Flavor Averaging Group - ICHEP 2016

Compilation of  $CP$  Asymmetries for  $B_s$  mesons

In PDG2014    New since PDG2014 (preliminary)    New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	Belle	CDF	LHCb	New Avg.
52	$\pi^+K^-$	$0.28 \pm 0.04$		<span style="color: red;"><math>0.22 \pm 0.07 \pm 0.02</math></span>	$0.27 \pm 0.04 \pm 0.01$	$0.26 \pm 0.04$

## Heavy Flavor Averaging Group - ICHEP 2016

Compilation of  $CP$  Asymmetries for  $\Lambda_b$  baryons

In PDG2014    New since PDG2014 (preliminary)    New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	CDF	LHCb	New Avg.
21	$p\pi^-$	$0.03 \pm 0.18$	<span style="color: red;"><math>0.06 \pm 0.07 \pm 0.03</math></span>		$0.06 \pm 0.08$
22	$pK^-$	$0.37 \pm 0.17$	<span style="color: red;"><math>-0.10 \pm 0.08 \pm 0.04</math></span>		$-0.10 \pm 0.09$
–	$\bar{K}^0p\pi^-$	New		<span style="color: red;"><math>0.22 \pm 0.13 \pm 0.03</math></span>	$0.22 \pm 0.13$
–	$\Lambda K^+\pi^-$	New		<span style="color: red;"><math>-0.53 \pm 0.23 \pm 0.11</math></span>	$-0.53 \pm 0.26$
–	$\Lambda K^+K^-$	New		<span style="color: red;"><math>-0.28 \pm 0.10 \pm 0.07</math></span>	$-0.28 \pm 0.12$

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