

# Heavy Flavor Averaging Group

$B^+$  Branching Fractions (decays with kaons part 1) ( $\times 10^6$ ) - August 2014. (UL 90% CL)  
 In PDG2014    New since PDG2014 (preliminary)    New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CLEO	CDF	LHCb	New avg.
262	$K^0\pi^+$	$23.7 \pm 0.8$	$23.9 \pm 1.1 \pm 1.0$	$23.97 \pm 0.53 \pm 0.71$	$18.8^{+3.7+2.1}_{-3.3-1.8}$			$23.79 \pm 0.75$
263	$K^+\pi^0$	$12.9 \pm 0.5$	$13.6 \pm 0.6 \pm 0.7$	$12.62 \pm 0.31 \pm 0.56$	$12.9^{+2.4+1.2}_{-2.2-1.1}$			$12.94^{+0.52}_{-0.51}$
264	$\eta'K^+$	$70.6 \pm 2.5$	$71.5 \pm 1.3 \pm 3.2$	$69.2 \pm 2.2 \pm 3.7$	$80^{+10}_{-9} \pm 7$			$71.1 \pm 2.6$
265	$\eta'K^{*+}$	$4.8^{+1.8}_{-1.6}$	$4.8^{+1.6}_{-1.4} \pm 0.8$	$< 2.9$	$< 35$			$4.8^{+1.8}_{-1.6}$
266	$\eta'K_0^*(1430)^+$	$5.2 \pm 2.1$	$5.2 \pm 1.9 \pm 1.0$					$5.2 \pm 2.1$
267	$\eta'K_2^*(1430)^+$	$28 \pm 5$	$28.0^{+4.6}_{-4.3} \pm 2.6$					$28.0^{+5.3}_{-5.0}$
268	$\eta K^+$	$2.4 \pm 0.4$	$2.94^{+0.39}_{-0.34} \pm 0.21$	$2.12 \pm 0.23 \pm 0.11$	$2.2^{+2.8}_{-2.2}$			$2.36^{+0.22}_{-0.21}$
269	$\eta K^{*+}$	$19.3 \pm 1.6$	$18.9 \pm 1.8 \pm 1.3$	$19.3^{+2.0}_{-1.9} \pm 1.5$	$26.4^{+9.6}_{-8.2} \pm 3.3$			$19.3 \pm 1.6$
270	$\eta K_0^*(1430)^+$	$18 \pm 4$	$18.2 \pm 2.6 \pm 2.6$					$18.2 \pm 3.7$
271	$\eta K_2^*(1430)^+$	$9.1 \pm 3.0$	$9.1 \pm 2.7 \pm 1.4$					$9.1 \pm 3.0$
272	$\eta(1295)K^+\dagger$	$2.9^{+0.8}_{-0.7}$	$2.9^{+0.8}_{-0.7} \pm 0.2 \S$					$2.9^{+0.8}_{-0.7}$
274	$\eta(1405)K^+\dagger$	$< 1.2$	$< 1.2$					$< 1.2$
275	$\eta(1475)K^+\dagger$	$13.8^{+2.1}_{-1.8}$	$13.8^{+1.8+1.0}_{-1.7-0.6}$					$13.8^{+2.1}_{-1.8}$
276	$f_1(1285)K^+$	$< 2.0$	$< 2.0$					$< 2.0$
277	$f_1(1420)K^+\dagger$	$< 2.9$	$< 2.9$					$< 2.9$
279	$\phi(1680)K^+\dagger$	$< 3.4$	$< 3.4$					$< 3.4$
279	$\phi(1680)K^+\dagger$	$< 3.4$	$< 3.4$					$< 3.4$
280	$f_0(1500)K^+$	$3.7 \pm 2.2$	$3.7 \pm 2.2 \ddagger$					$3.7 \pm 2.2$
281	$\omega K^+$	$6.7 \pm 0.8$	$6.3 \pm 0.5 \pm 0.3$	$8.1 \pm 0.6 \pm 0.6$	$3.2^{+2.4}_{-1.9} \pm 0.8$			$6.7 \pm 0.5$
282	$\omega K^{*+}$	$< 7.4$	$< 7.4$		$< 87$			$< 7.4$
283	$\omega(K\pi)_0^{*+}$	$28 \pm 4$	$27.5^{+3.0}_{-2.6}$					$27.5^{+3.0}_{-2.6}$
284	$\omega K_0^*(1430)^+$	$24 \pm 5$	$24.0 \pm 2.6 \pm 4.4$					$24.0 \pm 5.1$
285	$\omega K_2^*(1430)^+$	$21 \pm 4$	$21.5 \pm 3.6 \pm 2.4$					$21.5 \pm 4.3$
286	$a_0(980)^+K^0 \dagger$	$< 3.9$	$< 3.9$					$< 3.9$
287	$a_0(980)^0K^+ \dagger$	$< 2.5$	$< 2.5$					$< 2.5$
288	$K^{*0}\pi^+$	$10.1 \pm 0.9$	$10.8 \pm 0.6^{+1.2}_{-1.4}$	$9.7 \pm 0.6^{+0.8}_{-0.9}$	$< 16$			$10.1^{+0.8}_{-0.9}$
289	$K^{*+}\pi^0$	$8.2 \pm 1.9$	$8.2 \pm 1.5 \pm 1.1$		$7.1^{+11.4}_{-7.1} \pm 1.0$			$8.2 \pm 1.8$
290	$K^+\pi^+\pi^-$	$51 \pm 2.9$	$54.4 \pm 1.1 \pm 4.6$	$48.8 \pm 1.1 \pm 3.6$				$51.0 \pm 3.0$
291	$K^+\pi^+\pi^-(NR)$	$16.3^{+2.1}_{-1.5}$	$9.3 \pm 1.0^{+6.9}_{-1.7}$	$16.9 \pm 1.3^{+1.7}_{-1.6}$	$< 28$			$16.3 \pm 2.0$
292	$\omega(782)K^+$	$6 \pm 9$	$5.9^{+8.8+0.5}_{-9.0-0.4}$	<b><math>6.8 \pm 0.4 \pm 0.4</math></b>				$6.8 \pm 0.6$
293	$f_0(980)K^+ \dagger$	$9.4^{+1.0}_{-1.2}$	$10.3 \pm 0.5^{+2.0}_{-1.4}$	$8.8 \pm 0.8^{+0.9}_{-1.8}$				$9.4^{+0.9}_{-1.0}$
294	$f_2(1270)^0K^+$	$1.07 \pm 0.27$	$0.88^{+0.38+0.01}_{-0.33-0.03}$	$1.33 \pm 0.30^{+0.23}_{-0.34}$				$1.07 \pm 0.29$
295	$f_0(1370)^0K^+ \dagger$	$< 10.7$	$< 10.7$					$< 10.7$
296	$\rho^0(1450)K^+$	$< 11.7$	$< 11.7$					$< 11.7$
297	$f_2'(1525)K^+$	$< 3.4$	$< 3.4$					$< 3.4$
298	$\rho^0K^+$	$3.7 \pm 0.5$	$3.56 \pm 0.45^{+0.57}_{-0.46}$	$3.89 \pm 0.47^{+0.43}_{-0.41}$	$< 17$			$3.74^{+0.49}_{-0.45}$
299	$K_0^*(1430)^0\pi^+$	$45^{+9}_{-7}$	$32.0 \pm 1.2^{+10.8}_{-6.0}$	$51.6 \pm 1.7^{+7.0}_{-7.5}$				$45.1 \pm 6.3$
300	$K_2^*(1430)^0\pi^+$	$5.6^{+2.2}_{-1.5}$	$5.6 \pm 1.2^{+1.8}_{-0.8}$	$< 6.9$				$5.6^{+2.2}_{-1.4}$
301	$K^*(1410)^0\pi^+$	$< 45$	$< 45$	$< 45$				$< 45$
302	$K^*(1680)^0\pi^+$	$< 12$	$< 15$	$< 12$				$< 12$
303	$K^+\pi^0\pi^0$	$16.2 \pm 1.9$	$16.2 \pm 1.2 \pm 1.5$					$16.2 \pm 1.9$
304	$f_0(980)K^+$	$2.8 \pm 0.8$	$2.8 \pm 0.6 \pm 0.5$					$2.8 \pm 0.8$
305	$K^-\pi^+\pi^+$	$< 0.95$	$< 0.95$	$< 4.5$				$< 0.95$
306	$K^-\pi^+\pi^+(NR)$	$< 56$			$< 56$			$< 56$
307	$K_1(1270)^0\pi^+$	$< 40$	$< 40$					$< 40$
308	$K_1(1400)^0\pi^+$	$< 39$	$< 39$					$< 39$
309	$K^0\pi^+\pi^0$	$< 66$			$< 66$			$< 66$
310	$\rho^+K^0$	$8.0 \pm 1.5$	$8.0^{+1.4}_{-1.3} \pm 0.6$		$< 48$			$8.0^{+1.5}_{-1.4}$
311	$K^{*+}\pi^+\pi^-$	$75 \pm 10$	$75.3 \pm 6.0 \pm 8.1$					$75.3 \pm 10.1$
312	$K^{*+}\rho^0$	$4.6 \pm 1.1$	$4.6 \pm 1.0 \pm 0.4$		$< 74$			$4.6 \pm 1.1$
313	$f_0(980)K^{*+} \dagger$	$4.2 \pm 0.7$	$4.2 \pm 0.6 \pm 0.3$					$4.2 \pm 0.7$

† Product BF - daughter BF taken to be 100%

§ Product BF -  $\times \mathcal{B}(\eta(1295) \rightarrow \eta\pi\pi)$

‡ Average of results in  $K_S^0K^+K^-$ ,  $K_S^0K_S^0K^+$  [21] and  $K^+\pi^+\pi^-$  [56]. Reference [56] includes an  $f_X$  resonance with parameters that are compatible with  $f_0(1500)$ .

## Heavy Flavor Averaging Group

$B^+$  Branching Fractions (decays with kaons part 2) ( $\times 10^6$ ) - August 2014. (UL 90% CL)

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

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CLEO	CDF	LHCb	New avg.
314	$a_1^+ K^0$	$35 \pm 7$	$34.9 \pm 5.0 \pm 4.4$					$34.9 \pm 6.7$
315	$b_1^+ K^0 \dagger$	$9.6 \pm 1.9$	$9.6 \pm 1.7 \pm 0.9$					$9.6 \pm 1.9$
317	$K_1(1400)^+ \rho^0$	$< 780$	$< 780 \diamond$					$< 780 \diamond$
318	$K_2(1430)^+ \rho^0$	$< 1500$	$< 1500 \diamond$					$< 1500 \diamond$
319	$b_1^0 K^+ \dagger$	$9.1 \pm 2.0$	$9.1 \pm 1.7 \pm 1.0$					$9.1 \pm 2.0$
320	$b_1^+ K^{*0} \dagger$	$< 5.9$	$< 5.9$					$< 5.9$
321	$b_1^0 K^{*+} \dagger$	$< 6.7$	$< 6.7$					$< 6.7$
322	$K^+ \bar{K}^0$	$1.31 \pm 0.17$	$1.61 \pm 0.44 \pm 0.09$	$1.11 \pm 0.19 \pm 0.05$	$< 3.3$		<span style="color: red;"><math>1.52 \pm 0.21 \pm 0.05</math></span>	$1.32 \pm 0.14$
323	$\bar{K}^0 K^+ \pi^0$	$< 24$			$< 24$			$< 24$
324	$K^+ K_S K_S$	$10.8 \pm 0.6$	$10.6 \pm 0.5 \pm 0.3$	$13.4 \pm 1.9 \pm 1.5$				$10.8 \pm 0.6$
325	$f_0(980) K^+$	$14.7 \pm 3.3$	$14.7 \pm 2.8 \pm 1.8$					$14.7 \pm 3.3$
326	$f_0(1710) K^+$	$0.48^{+0.40}_{-0.26}$	$0.48^{+0.40}_{-0.24} \pm 0.11$					$0.48^{+0.41}_{-0.26}$
327	$K^+ K_S K_S (NR)$	$20 \pm 4$	$19.8 \pm 3.7 \pm 2.5$					$19.8 \pm 4.5$
328	$K_S K_S \pi^+$	$< 0.51$	$< 0.51$	$< 3.2$				$< 0.51$
329	$K^+ K^- \pi^+$	$5.0 \pm 0.7$	$5.0 \pm 0.5 \pm 0.5$	$< 13$				$5.0 \pm 0.7$
330	$K^+ K^- \pi^+ (NR)$	$< 75$			$< 75$			$< 75$
331	$\bar{K}^{*0} K^+$	$< 1.1$	$< 1.1$		$< 5.3$			$< 1.1$
332	$\bar{K}_0^*(1430)^0 K^+$	$< 2.2$	$< 2.2$					$< 2.2$
333	$K^+ K^+ \pi^-$	$< 0.16$	$< 0.16$	$< 2.4$				$< 0.16$
334	$K^+ K^+ \pi^- (NR)$	$< 87.9$						$< 87.9$
335	$f_2'(1525) K^+$	$1.8 \pm 0.5$	$1.8 \pm 0.5 \ddagger$	$< 8$				$1.8 \pm 0.5$
336	$f_J(2220) K^+$	$< 1.2$		$< 1.2$				$< 1.2$
337	$K^{*+} \pi^+ K^-$	$< 11.8$	$< 11.8$					$< 11.8$
338	$K^{*+} \bar{K}^{*0}$	$1.2 \pm 0.5$	$1.2 \pm 0.5 \pm 0.1$		$< 71$			$1.2 \pm 0.5$
339	$K^{*+} K^+ \pi^-$	$< 6.1$	$< 6.1$					$< 6.1$
340	$K^+ K^- K^+$	$34.0 \pm 1.4$	$34.6 \pm 0.6 \pm 0.9$	$30.6 \pm 1.2 \pm 2.3$				$34.0 \pm 1.0$
341	$\phi K^+$	$8.8^{+0.7}_{-0.6}$	$9.2 \pm 0.4^{+0.7}_{-0.5}$	$9.6 \pm 0.9^{+1.1}_{-0.8}$	$5.5^{+2.1}_{-1.8} \pm 0.6$	$7.6 \pm 1.3 \pm 0.6$		$8.8 \pm 0.5$
342	$f_0(980) K^+$	$9.4 \pm 3.2$	$9.4^{+1.6}_{-2.8}$					$9.4^{+1.6}_{-2.8}$
343	$a_2(1320) K^+ \dagger$	$< 1.1$		$< 1.1$				$< 1.1$
344	$X_0(1550) K^+$	$4.3 \pm 0.7$	$4.3 \pm 0.60 \pm 0.30$					$4.30 \pm 0.67$
345	$\phi(1680) K^+ \dagger$	$< 0.8$		$< 0.8$				$< 0.8$
346	$f_0(1710) K^+ \dagger$	$1.1 \pm 0.6$	$1.12 \pm 0.25 \pm 0.50$					$1.12 \pm 0.56$
347	$K^+ K^- K^+ (NR)$	$23.8^{+2.8}_{-5.0}$	$22.8 \pm 2.7 \pm 7.6$	$24.0 \pm 1.5^{+2.6}_{-6.0}$				$23.8^{+2.9}_{-5.1}$
348	$K^{*+} K^+ K^-$	$36 \pm 5$	$36.2 \pm 3.3 \pm 3.6$					$36.2 \pm 4.9$
349	$\phi K^{*+}$	$10.0 \pm 2.0$	$11.2 \pm 1.0 \pm 0.9$	$6.7^{+2.1+0.7}_{-1.9-1.0}$	$10.6^{+6.4+1.8}_{-4.9-1.6}$			$10.0 \pm 1.1$
350	$\phi(K\pi)_0^{*+}$	$8.3 \pm 1.6$	$8.3^{+1.4}_{-0.8}$					$8.3^{+1.4}_{-0.8}$
351	$\phi K_1(1270)^+$	$6.1 \pm 1.9$	$6.1 \pm 1.6 \pm 1.1$					$6.1 \pm 1.9$
352	$\phi K_1(1400)^+$	$< 3.2$	$< 3.2$					$< 3.2$
353	$\phi K^*(1410)^+$	$< 4.3$	$< 4.3$					$< 4.3$
354	$\phi K_0^*(1430)^+$	$7.0 \pm 1.6$	$7.0 \pm 1.3 \pm 0.9$					$7.0 \pm 1.6$
355	$\phi K_2^*(1430)^+$	$8.4 \pm 2.1$	$8.4 \pm 1.8 \pm 1.0$					$8.4 \pm 2.1$
356	$\phi K_2(1770)^+$	$< 15$	$< 15$					$< 15$
357	$\phi K_2(1820)^+$	$< 16.3$	$< 16.3$					$< 16.3$
358	$a_1^+ K^{*0}$	$< 3.6$	$< 3.6$					$< 3.6$
359	$\phi \phi K^+ \S$	$5.0 \pm 1.2$	$5.6 \pm 0.5 \pm 0.3$	$2.6^{+1.1}_{-0.9} \pm 0.3$				$5.0 \pm 0.5$
360	$\eta' \eta' K^+$	$< 25$	$< 25$					$< 25$
361	$K^+ \omega \phi$	$< 1.9$		$< 1.9$				$< 1.9$
362	$K^+ X(1812) \dagger$	$< 0.32$		$< 0.32$				$< 0.32$

$\dagger$  Product BF - daughter BF taken to be 100%;  $\S M_{\phi\phi} < 2.85 \text{ GeV}/c^2$

$\ddagger$  Average of results in  $K^+ K^- K^+$  and  $K_S^0 K_S^0 K^+$ .

$\diamond$  Result from ARGUS.

## Heavy Flavor Averaging Group

$B^+$  Branching Fractions (decays without kaons) ( $\times 10^6$ ) - August 2014. (UL 90% CL)  
 In PDG2014 New since PDG2014 (preliminary) New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CLEO	CDF	LHCb	New avg.
379	$\pi^+\pi^0$	$5.5 \pm 0.4$	$5.02 \pm 0.46 \pm 0.29$	$5.86 \pm 0.26 \pm 0.38$	$4.6^{+1.8+0.6}_{-1.6-0.7}$			$5.48^{+0.35}_{-0.34}$
380	$\pi^+\pi^+\pi^-$	$15.2 \pm 1.4$	$15.2 \pm 0.6 \pm 1.3$					$15.2 \pm 1.4$
381	$\rho^0\pi^+$	$8.3 \pm 1.2$	$8.1 \pm 0.7^{+1.3}_{-1.6}$	$8.0^{+2.3}_{-2.0} \pm 0.7$	$10.4^{+3.3}_{-3.4} \pm 2.1$			$8.3^{+1.2}_{-1.3}$
382	$f_0(980)\pi^+ \dagger$	$< 1.5$	$< 1.5$					$< 1.5$
383	$f_2(1270)\pi^+$	$1.6^{+0.7}_{-0.4}$	$1.57 \pm 0.42^{+0.55}_{-0.25}$					$1.57^{+0.69}_{-0.49}$
384	$\rho(1450)^0\pi^+ \dagger$	$1.4^{+0.6}_{-0.9}$	$1.4 \pm 0.4^{+0.5}_{-0.8}$					$1.4^{+0.6}_{-0.9}$
385	$f_0(1370)\pi^+ \dagger$	$< 4.0$	$< 4.0$					$< 4.0$
386	$f_0(500)\pi^+ \dagger$	$< 4.1$	$< 4.1$					$< 4.1$
387	$\pi^+\pi^-\pi^+(NR)$	$5.3^{+1.5}_{-1.1}$	$5.3 \pm 0.7^{+1.3}_{-0.8}$					$5.3^{+1.5}_{-1.1}$
388	$\pi^+\pi^0\pi^0$	$< 890$	$< 890$					$< 890$
389	$\rho^+\pi^0$	$10.9 \pm 1.4$	$10.2 \pm 1.4 \pm 0.9$	$13.2 \pm 2.3^{+1.4}_{-1.9}$	$< 43$			$10.9^{+1.4}_{-1.5}$
391	$\rho^+\rho^0$	$24.0 \pm 1.9$	$23.7 \pm 1.4 \pm 1.4$	$31.7 \pm 7.1^{+3.8}_{-6.7}$				$24.0^{+1.9}_{-2.0}$
392	$f_0(980)\rho^+ \dagger$	$< 2.0$	$< 2.0$					$< 2.0$
393	$a_1^+\pi^0$	$26 \pm 7$	$26.4 \pm 5.4 \pm 4.1$					$26.4 \pm 6.8$
394	$a_1^0\pi^+$	$20 \pm 6$	$20.4 \pm 4.7 \pm 3.4$					$20.4 \pm 5.8$
395	$\omega\pi^+$	$6.9 \pm 0.5$	$6.7 \pm 0.5 \pm 0.4$	$6.9 \pm 0.6 \pm 0.5$	$11.3^{+3.3}_{-2.9} \pm 1.4$			$6.9 \pm 0.5$
396	$\omega\rho^+$	$15.9 \pm 2.1$	$15.9 \pm 1.6 \pm 1.4$		$< 61$			$15.9 \pm 2.1$
397	$\eta\pi^+$	$4.02 \pm 0.27$	$4.00 \pm 0.40 \pm 0.24$	$4.07 \pm 0.26 \pm 0.21$	$1.2^{+2.8}_{-1.2}$			$4.02 \pm 0.27$
398	$\eta\rho^+$	$7.0 \pm 2.9$	$9.9 \pm 1.2 \pm 0.8$	$4.1^{+1.4}_{-1.3} \pm 0.4$	$4.8^{+5.2}_{-3.8}$			$6.9 \pm 1.0$
399	$\eta'\pi^+$	$2.7 \pm 0.9$	$3.5 \pm 0.6 \pm 0.2$	$1.8^{+0.7}_{-0.6} \pm 0.1$	$1.0^{+5.8}_{-1.0}$			$2.7^{+0.5}_{-0.4}$
400	$\eta'\rho^+$	$9.7 \pm 2.2$	$9.7^{+1.9}_{-1.8} \pm 1.1$	$< 5.8$	$< 33$			$9.7^{+2.2}_{-2.1}$
401	$\phi\pi^+$	$< 0.15$	$< 0.24$	$< 0.33$	$< 5$		$< 0.15$	$< 0.15$
402	$\phi\rho^+$	$< 3.0$	$< 3.0$		$< 16$			$< 3.0$
403	$a_0(980)^0\pi^+ \dagger$	$< 5.8$	$< 5.8$					$< 5.8$
404	$a_0(980)^+\pi^0 \dagger$	$< 1.4$	$< 1.4$					$< 1.4$
405	$\pi^+\pi^+\pi^+\pi^-\pi^-$	$< 860$	$< 860$					$< 860$
406	$\rho^0 a_1(1260)^+$	$< 620$			$< 620$			$< 620$
407	$\rho^0 a_2(1320)^+$	$< 720$			$< 720$			$< 720$
408	$b_1^0\pi^+ \dagger$	$6.7 \pm 2.0$	$6.7 \pm 1.7 \pm 1.0$					$6.7 \pm 2.0$
409	$b_1^+\pi^0 \dagger$	$< 3.3$	$< 3.3$					$< 3.3$
410	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0$	$< 6300$	$< 6300$					$< 6300$
411	$b_1^+\rho^0 \dagger$	$< 5.2$	$< 5.2$					$< 5.2$
413	$b_1^0\rho^+ \dagger$	$< 3.3$	$< 3.3$					$< 3.3$

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RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CLEO	CDF	LHCb	New avg.
227	$K^+\pi^-$	$19.6 \pm 0.5$	$19.1 \pm 0.6 \pm 0.6$	$20.0 \pm 0.34 \pm 0.60$	$18.0_{-2.1-0.9}^{+2.3+1.2}$			$19.57_{-0.52}^{+0.53}$
228	$K^0\pi^0$	$9.9 \pm 0.5$	$10.1 \pm 0.6 \pm 0.4$	$9.68 \pm 0.46 \pm 0.50$	$12.8_{-3.3-1.4}^{+4.0+1.7}$			$9.93 \pm 0.49$
229	$\eta'K^0$	$66 \pm 4$	$68.5 \pm 2.2 \pm 3.1$	$58.9_{-3.5}^{+3.6} \pm 4.3$	$89_{-16}^{+18} \pm 9$			$66.1 \pm 3.1$
230	$\eta'K^{*0}$	$3.1 \pm 0.9$	$3.1_{-0.8}^{+0.9} \pm 0.3$	<span style="color: red;"><math>2.6 \pm 0.7 \pm 0.2</math></span>	$7.8_{-5.7}^{+7.7}$			$2.8_{-0.5}^{+0.6}$
231	$\eta'K_0^*(1430)^0$	$6.3 \pm 1.6$	$6.3 \pm 1.3 \pm 0.9$					$6.3 \pm 1.6$
232	$\eta'K_2^*(1430)^0$	$13.7 \pm 3.2$	$13.7_{-1.9}^{+3.0} \pm 1.2$					$13.7_{-2.2}^{+3.2}$
233	$\eta K^0$	$1.23_{-0.24}^{+0.27}$	$1.15_{-0.38}^{+0.43} \pm 0.09$	$1.27_{-0.29}^{+0.33} \pm 0.08$	$0.0_{-0.0}^{+3.0}$			$1.23_{-0.24}^{+0.27}$
234	$\eta K^{*0}$	$15.9 \pm 1.0$	$16.5 \pm 1.1 \pm 0.8$	$15.2 \pm 1.2 \pm 1.0$	$13.8_{-4.6}^{+5.5} \pm 1.6$			$15.9 \pm 1.0$
235	$\eta K_0^*(1430)^0$	$11.0 \pm 2.2$	$11.0 \pm 1.6 \pm 1.5$					$11.0 \pm 2.2$
236	$\eta K_2^*(1430)^0$	$9.6 \pm 2.1$	$9.6 \pm 1.8 \pm 1.1$					$9.6 \pm 2.1$
237	$\omega K^0$	$5.0 \pm 0.6$	$5.4 \pm 0.8 \pm 0.3$	<span style="color: red;"><math>4.5 \pm 0.4 \pm 0.3</math></span>	$10.0_{-4.2}^{+5.4} \pm 1.4$			$4.8 \pm 0.4$
238	$a_0(980)^0 K^0 \dagger$	$< 7.8$	$< 7.8$					$< 7.8$
239	$b_1^0 K^0 \dagger$	$< 7.8$	$< 7.8$					$< 7.8$
240	$a_0(980)^- K^+ \dagger$	$< 1.9$	$< 1.9$					$< 1.9$
241	$b_1^- K^+ \dagger$	$7.4 \pm 1.4$	$7.4 \pm 1.0 \pm 1.0$					$7.4 \pm 1.4$
242	$b_1^0 K^{*0} \dagger$	$< 8.0$	$< 8.0$					$< 8.0$
243	$b_1^- K^{*+} \dagger$	$< 5.0$	$< 5.0$					$< 5.0$
244	$a_0(1450)^- K^+ \dagger$	$< 3.1$	$< 3.1$					$< 3.1$
245	$K_S X^0(\text{Familon}) \dagger$	$< 53$				$< 53$		$< 53$
246	$\omega K^{*0}$	$2.0 \pm 0.5$	$2.2 \pm 0.6 \pm 0.2$	$1.8 \pm 0.7_{-0.2}^{+0.3}$	$< 23$			$2.0 \pm 0.5$
247	$\omega K^{*0}$	$18.4 \pm 2.5$	$18.4_{-1.7}^{+1.8}$					$18.4_{-1.7}^{+1.8}$
248	$\omega K_0^*(1430)^0$	$16.0 \pm 3.4$	$16.0 \pm 1.6 \pm 3.0$					$16.0 \pm 3.4$
249	$\omega K_2^*(1430)^0$	$10.1 \pm 2.3$	$10.1 \pm 2.0 \pm 1.1$					$10.1 \pm 2.3$
250	$\omega K^+\pi^- (NR)^1$	$5.1 \pm 1.0$		$5.1 \pm 0.7 \pm 0.7$				$5.1 \pm 1.0$
251	$K^+\pi^-\pi^0$	$37.8 \pm 3.2$	$38.5 \pm 1.0 \pm 3.9$	$36.6_{-4.3}^{+4.2} \pm 3.0$	$< 40$			$37.8 \pm 3.2$
252	$\rho^- K^+$	$7.0 \pm 0.9$	$6.6 \pm 0.5 \pm 0.8$	$15.1_{-3.3-2.6}^{+3.4+2.4}$	$< 32$			$7.0 \pm 0.9$
253	$\rho(1450)^- K^+$	$2.4 \pm 1.2$	$2.4 \pm 1.0 \pm 0.6$					$2.4 \pm 1.2$
254	$\rho(1700)^- K^+$	$0.6 \pm 0.7$	$0.6 \pm 0.6 \pm 0.4$					$0.6 \pm 0.7$
255	$K^+\pi^-\pi^0 (NR)$	$2.8 \pm 0.6$	$2.8 \pm 0.5 \pm 0.4$	$< 9.4$				$2.8 \pm 0.6$
256	$(K\pi)_0^{*+}\pi^-$	$34 \pm 5$	$34.2 \pm 2.4 \pm 4.1$					$34.2 \pm 4.8$
257	$(K\pi)_0^{*+}\pi^0$	$8.5 \pm 1.7$	$8.6_{-1.3}^{+1.1}$					$8.6_{-1.3}^{+1.1}$
258	$K_2^*(1430)^0\pi^0$	$< 4.0$	$< 4.0$					$< 4.0$
259	$K^*(1680)^0\pi^0$	$< 7.5$	$< 7.5$					$< 7.5$
260	$K_x^{*0}\pi^0{}^2$	$6.1 \pm 1.6$		$6.1_{-1.5-0.6}^{+1.6+0.5}$				$6.1_{-1.6}^{+1.7}$
261	$K^0\pi^+\pi^-$	$65 \pm 8$	$50.2 \pm 1.5 \pm 1.8$	$47.5 \pm 2.4 \pm 3.7$	$50_{-9}^{+10} \pm 7$		$65.2_{-5.1}^{+6.0} \diamond$	$51.8 \pm 1.9$
262	$K^0\pi^+\pi^- (NR)$	$14.7_{-2.6}^{+4.0}$	$11.1_{-1.0}^{+2.5} \pm 0.9$	$19.9 \pm 2.5_{-2.0}^{+1.7}$				$14.7 \pm 2.0$
263	$\rho^0 K^0$	$4.7 \pm 0.6$	$4.4 \pm 0.7 \pm 0.3$	$6.1 \pm 1.0_{-1.2}^{+1.1}$	$< 39$			$4.7 \pm 0.7$
264	$K^{*+}\pi^-$	$8.4 \pm 0.8$	$8.2 \pm 0.9{}^3$	$8.4 \pm 1.1_{-0.9}^{+1.0}$	$16_{-5}^{+6} \pm 2$			$8.4 \pm 0.8$
265	$K_0^*(1430)^+\pi^-$	$33 \pm 7$	$29.9_{-1.7}^{+2.3} \pm 3.6$	$49.7 \pm 3.8_{-8.2}^{+6.8}$				$33.5_{-3.8}^{+3.9}$
266	$K_x^{*+}\pi^-{}^2$	$5.1 \pm 1.6$		$5.1_{-1.5-0.7}^{+1.5+0.6}$				$5.1_{-1.7}^{+1.6}$
267	$K^*(1410)^+\pi^- \dagger$	$< 3.8$		$< 3.8$				$< 3.8$
268	$f_0(980)K^0 \dagger$	$7.0 \pm 0.9$	$6.9 \pm 0.8 \pm 0.6$	$7.6 \pm 1.7_{-1.3}^{+0.9}$				$7.0 \pm 0.9$
269	$f_2(1270)^0 K^0$	$2.7_{-1.2}^{+1.3}$	$2.7_{-0.8}^{+1.0} \pm 0.9$	$< 2.5 \dagger$				$2.7_{-1.2}^{+1.3}$
270	$f_x(1300)^0 K^0$	$1.8 \pm 0.7$	$1.81_{-0.45}^{+0.55} \pm 0.48$					$1.81_{-0.66}^{+0.73}$

$\dagger$  Product BF - daughter BF taken to be 100%;  $\ddagger$  Relative BF converted to absolute BF;  ${}^1 0.755 < M(K\pi) < 1.250 \text{ GeV}/c^2$ ;  ${}^2 K_x^{*0}$  stands for the possible candidates for  $K^*(1410)$ ,  $K_0^*(1430)$ ,  $K_2^*(1430)$ ;  ${}^3$  Average of BABAR results from  $B^0 \rightarrow K^+\pi^-\pi^0$  and  $B^0 \rightarrow K^0\pi^+\pi^-$ .  
 $\diamond$  Obtained from a fit to the ratios of BF's measured by LHCb (Ref. [137]) and to the averages of the BF's in their numerators, as measured by other experiments (RPP 292 and 298).

# Heavy Flavor Averaging Group

$B^0$  Branching Fractions (decays with kaons part 2) ( $\times 10^6$ ) - August 2014. (UL 90% CL)  
 In PDG2014    New since PDG2014 (preliminary)    New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CLEO	CDF	LHCb	New avg.
271	$K^{*0}\pi^0$	$3.3 \pm 0.6$	$3.3 \pm 0.5 \pm 0.4$	$< 3.5$	$< 3.6$			$3.3 \pm 0.6$
272	$K_2^{*+}(1430)\pi^-\pi^-$	$< 6$	$< 16.2$	$< 6.3$				$< 6.3$
273	$K^{*+}(1680)\pi^-\pi^-$	$< 10$	$< 25$	$< 10.1$				$< 10.1$
275	$\rho^0 K^+\pi^-$	$2.8 \pm 0.7$		$2.8 \pm 0.5 \pm 0.5^2$				$2.8 \pm 0.7$
276	$f_0(980)K^+\pi^-$	$1.4^{+0.5}_{-0.6}$		$1.4 \pm 0.4^{+0.3}_{-0.4}{}^2$				$1.4^{+0.5}_{-0.6}$
277	$K^+\pi^-\pi^+\pi^-$	$< 2.1$		$< 2.1$				$< 2.1$
278	$K^{*0}\pi^+\pi^-$	$55 \pm 5$	$54.5 \pm 2.9 \pm 4.3$					$54.5 \pm 5.2$
279	$K^{*0}\rho^0$	$3.9 \pm 1.3$	$5.1 \pm 0.6^{+0.6}_{-0.8}$	$2.1^{+0.8+0.9}_{-0.7-0.5}$	$< 34$			$3.9 \pm 0.8$
280	$f_0(980)K^{*0}\dagger$	$3.9^{+2.1}_{-1.8}$	$5.7 \pm 0.6 \pm 0.4$	$1.4^{+0.6+0.6}_{-0.5-0.4}$				$3.9 \pm 0.5$
—	$f_0(980)K_2^{*+}(1430)^0\dagger$	New	<b><math>8.6 \pm 1.7 \pm 1.0</math></b>					$8.6 \pm 2.0$
281	$K_1(1270)^+\pi^-$	$< 30$	$17^{+6}_{-25}$					$17^{+6}_{-25}$
282	$K_1(1400)^+\pi^-$	$< 27$	$16^{+8}_{-24}$					$16^{+8}_{-24}$
283	$a_1 K^+$	$16 \pm 4$	$16.3 \pm 2.9 \pm 2.3$					$16.3 \pm 3.7$
284	$K^{*+}\rho^-$	$10.3 \pm 0.26$	$10.3 \pm 2.3 \pm 1.3$					$10.3 \pm 2.6$
285	$K_0(1430)^+\rho^-$	$28 \pm 12$	$28 \pm 10 \pm 6$					$28 \pm 11$
287	$K_0^+(1430)^0\rho^0$	$27 \pm 6$	$27 \pm 4 \pm 4$					$27 \pm 5$
288	$K_0^*(1430)^0 f_0(980)$	$2.7 \pm 0.9$	$2.7 \pm 0.7 \pm 0.6$					$2.7 \pm 0.9$
289	$K_2^{*+}(1430)^0 f_0(980)$	$8.6 \pm 2.0$	$8.6 \pm 1.7 \pm 1.0$					$8.6 \pm 2.0$
290	$K^+K^-$	$0.13 \pm 0.05$	$< 0.5$	$0.10 \pm 0.08 \pm 0.04$	$< 0.8$	$0.23 \pm 0.10 \pm 0.10\dagger$	$0.12^{+0.08}_{-0.07} \pm 0.01\dagger$	$0.13^{+0.06}_{-0.05}$
291	$K^0\bar{K}^0$	$1.21 \pm 0.16$	$1.08 \pm 0.28 \pm 0.11$	$1.26 \pm 0.19 \pm 0.05$	$< 3.3$			$1.21 \pm 0.16$
292	$K^0 K^-\pi^+$	$7.3 \pm 1.1$	$6.4 \pm 1.0 \pm 0.6$	$< 18$	$< 21$		$6.64 \pm 0.99 \diamond$	$6.54 \pm 0.75$
293	$K^{*0}\bar{K}^0$	$< 1.9$	$< 1.9$					$< 1.9$
—	$K^{*-}K^+$	New					$< 0.4 \ddagger$	$< 0.4 \ddagger$
294	$K^+K^-\pi^0$	$2.2 \pm 0.6$		$2.17 \pm 0.60 \pm 0.24$	$< 19$			$2.17 \pm 0.65$
295	$K_S K_S \pi^0$	$< 0.9$	$< 0.9$					$< 0.9$
296	$K_S K_S \eta$	$< 1.0$	$< 1.0$					$< 1.0$
297	$K_S K_S \eta'$	$< 2.0$	$< 2.0$					$< 2.0$
298	$K^+K^-K^0$	$26.3 \pm 1.5$	$26.5 \pm 0.9 \pm 0.8$	$28.3 \pm 3.3 \pm 4.0$			$19.1 \pm 1.9 \diamond$	$24.5 \pm 1.0$
299	$\phi K^0$	$7.3 \pm 0.7$	$7.1 \pm 0.6^{+0.4}_{-0.3}$	$9.0^{+2.2}_{-1.8} \pm 0.7$	$5.4^{+3.7}_{-2.7} \pm 0.7$			$7.3^{+0.7}_{-0.6}$
300	$f_0(980)K^0\dagger$	$7.0^{+3.5}_{-3.0}$	$7.0^{+2.6}_{-1.8} \pm 2.4$					$7.0^{+3.5}_{-3.0}$
301	$f_0(1500)K^0\dagger$	$13^{+7}_{-5}$	$13.3^{+5.8}_{-4.4} \pm 3.2$					$13.3^{+6.6}_{-5.4}$
302	$f_2'(1525)K^0$	$0.3^{+0.5}_{-0.4}$	$0.29^{+0.27}_{-0.18} \pm 0.36$					$0.29^{+0.45}_{-0.40}$
303	$f_0(1710)K^0\dagger$	$4.4 \pm 0.9$	$4.4 \pm 0.7 \pm 0.5$					$4.4 \pm 0.9$
304	$K^0 K^+ K^- (NR)$	$33 \pm 10$	$33 \pm 5 \pm 9$					$33 \pm 10$
305	$K_S K_S K_S$	$6.2^{+1.2}_{-1.1}$	$6.19 \pm 0.48 \pm 0.19$	$4.2^{+1.6}_{-1.3} \pm 0.8$				$6.04 \pm 0.50$
306	$f_0(980)K_S\dagger$	$2.7 \pm 1.8$	$2.7^{+1.3}_{-1.2} \pm 1.3 \dagger$					$2.7 \pm 1.8$
307	$f_0(1710)K_S\dagger$	$0.50^{+0.050}_{-0.026}$	$0.50^{+0.46}_{-0.24} \pm 0.11 \dagger$					$0.50^{+0.47}_{-0.26}$
308	$f_0(2010)K_S\dagger$	$0.5 \pm 0.6$	$0.54^{+0.21}_{-0.20} \pm 0.52 \dagger$					$0.54 \pm 0.56$
309	$K_S K_S K_S (NR)$	$13.3 \pm 3.1$	$13.3^{+2.2}_{-2.3} \pm 2.2$					$13.3^{+3.1}_{-3.2}$
310	$K_S K_S K_L$	$< 16$	$< 16^2$					$< 16^2$
311	$K^{*0}K^+K^-$	$27.5 \pm 2.6$	$27.5 \pm 1.3 \pm 2.2$					$27.5 \pm 2.6$
312	$\phi K^{*0}$	$10.0 \pm 0.5$	$9.7 \pm 0.5 \pm 0.6$	$10.4 \pm 0.5 \pm 0.6$	$11.5^{+4.5+1.8}_{-3.7-1.7}$			$10.1^{+0.6}_{-0.5}$
313	$K^+\pi^-\pi^+K^-$	$< 72$		$< 72^3$				$< 72^3$
314	$K^{*0}\pi^+K^-$	$4.5 \pm 1.3$	$4.6 \pm 1.1 \pm 0.8$	$< 13.9^3$				$4.6 \pm 1.4$
315	$K^{*0}\bar{K}^{*0}$	$0.8 \pm 0.5$	$1.28^{+0.35}_{-0.30} \pm 0.11$	$0.26^{+0.33+0.10}_{-0.29-0.08}$	$< 22$			$0.81 \pm 0.23$
316	$K^+\pi^-K^+\pi^- (NR)$	$< 6.0$		$< 6.0^3$				$< 6.0^3$
317	$K^{*0}K^+\pi^-$	$< 2.2$	$< 2.2$	$< 7.6^3$				$< 2.2$
318	$K^{*0}K^{*0}$	$< 0.2$	$< 0.41$	$< 0.2$				$< 0.2$
319	$K^{*+}K^{*-}$	$< 2.0$	$< 2.0$		$< 37$			$< 2.0$
320	$K_2^{*+}(1400)^0\phi$	$< 5000$	$< 5000^5$		$< 141$			$< 5000^5$
321	$(K\pi)_0^0\phi$	$4.3 \pm 0.4$	$4.3 \pm 0.4 \pm 0.4$	$4.3 \pm 0.4 \pm 0.4$				$4.3 \pm 0.4$
322	$(K\pi)_0^{*0}\phi^4$	$< 1.7$	$< 1.7$					$< 1.7$
323	$K_0^*(1430)^0\pi^+K^-$	$< 31.8$		$< 31.8^3$				$< 31.8^3$
324	$K_0^*(1430)^0\bar{K}^{*0}$	$< 3.3$		$< 3.3$				$< 3.3$
325	$K_0^*(1430)^0\bar{K}_0^*(1430)^0$	$< 8.4$		$< 8.4$				$< 8.4$
326	$\phi K_0^*(1430)^0$	$3.9 \pm 0.8$	$3.9 \pm 0.5 \pm 0.6$	<b><math>4.3 \pm 0.4 \pm 0.4</math></b>				$4.2 \pm 0.5$
327	$K_0^*(1430)^0 K^{*0}$	$< 1.7$		$< 1.7$				$< 1.7$
328	$K_0^*(1430)^0 K_0^*(1430)^0$	$< 4.7$		$< 4.7$				$< 4.7$
329	$\phi K^*(1680)^0$	$< 3.5$	$< 3.5$					$< 3.5$
330	$\phi K_3^*(1780)^0$	$< 2.7$	$< 2.7$					$< 2.7$
331	$\phi K_4^*(2045)^0$	$< 15.3$	$< 15.3$					$< 15.3$
332	$\rho^0 K_2^*(1430)^0$	$< 1100$	$< 1100^5$					$< 1100^5$
333	$\phi K_2^*(1430)^0$	$6.8 \pm 0.9$	$7.5 \pm 0.9 \pm 0.5$	$5.5^{+0.9}_{-0.7} \pm 1.0$				$6.8 \pm 0.8$
334	$\phi\phi K^0 \S$	$4.5 \pm 0.9$	$4.5 \pm 0.8 \pm 0.3$					$4.5 \pm 0.9$
335	$\eta'\eta'K^0$	$< 31$	$< 31$					$< 31$

$\dagger$  Product BF - daughter BF taken to be 100%,  $\S M_{\phi\phi} < 2.85 \text{ GeV}/c^2$   $\ddagger$  Relative BF converted to absolute BF  $^{1}0.55 < M(\pi\pi) < 1.42 \text{ GeV}/c^2$ ;  $^{2}0.75 < M(K\pi) < 1.20 \text{ GeV}/c^2$ ;  $^{3}0.70 < M(K\pi) < 1.70 \text{ GeV}/c^2$ ;  $^{4}1.60 < M(K\pi) < 2.15 \text{ GeV}/c^2$ .

$^5$  Result from ARGUS.

$\diamond$  Obtained from a fit to the ratios of BFs measured by LHCb (Ref. [137]) and to the averages of the BFs therein, as measured by other experiments (excluding the present line).

## Heavy Flavor Averaging Group

$B^0$  Branching Fractions (decays without kaons) ( $\times 10^6$ ) - August 2014. (UL 90% CL)  
 In PDG2014    New since PDG2014 (preliminary)    New since PDG2014 (published)

RPP#	Mode	PDG2014 Avg.	BABAR	Belle	CLEO	CDF	LHCb	New avg.
356	$\pi^+\pi^-$	$5.15 \pm 0.19$	$5.5 \pm 0.4 \pm 0.3$	$5.04 \pm 0.21 \pm 0.18$	$4.5^{+1.4+0.5}_{-1.2-0.4}$	$5.02 \pm 0.33 \pm 0.35^\ddagger$	<span style="color: red;"><math>5.08 \pm 0.17 \pm 0.37^\ddagger</math></span>	$5.10 \pm 0.19$
357	$\pi^0\pi^0$	$1.91 \pm 0.22$	$1.83 \pm 0.21 \pm 0.13$	<span style="color: blue;"><math>0.90 \pm 0.12 \pm 0.10</math></span>	$< 4.4$			$1.17 \pm 0.13$
358	$\eta\pi^0$	$< 1.5$	$< 1.5$	$< 2.5$	$< 2.9$			$< 1.5$
359	$\eta\eta$	$< 1.0$	$< 1.0$	$< 2.0$	$< 18$			$< 1.0$
360	$\eta'\pi^0$	$1.2 \pm 0.6$	$0.9 \pm 0.4 \pm 0.1$	$2.8 \pm 1.0 \pm 0.3$	$0.0^{+1.8}_{-0.0}$			$1.2 \pm 0.4$
361	$\eta'\eta'$	$< 1.7$	$< 1.7$	$< 6.5$	$< 47$			$< 1.7$
362	$\eta'\eta$	$< 1.2$	$< 1.2$	$< 4.5$	$< 27$			$< 1.2$
363	$\eta'\rho^0$	$< 1.3$	$< 2.8$	$< 1.3$	$< 12$			$< 1.3$
364	$f_0(980)\eta' \dagger$	$< 0.9$	$< 0.9$					$< 0.9$
365	$\eta\rho^0$	$< 1.5$	$< 1.5$	$< 1.9$	$< 10$			$< 1.5$
366	$f_0(980)\eta \dagger$	$< 0.4$	$< 0.4$					$< 0.4$
367	$\omega\eta$	$0.94^{+0.40}_{-0.31}$	$0.94^{+0.35}_{-0.30} \pm 0.09$		$< 12$			$0.94^{+0.36}_{-0.31}$
368	$\omega\eta'$	$1.0^{+0.5}_{-0.4}$	$1.01^{+0.46}_{-0.38} \pm 0.09$	$< 2.2$	$< 60$			$1.01^{+0.47}_{-0.39}$
369	$\omega\rho^0$	$< 1.6$	$< 1.6$		$< 11$			$< 1.6$
370	$f_0(980)\omega \dagger$	$< 1.5$	$< 1.5$					$< 1.5$
371	$\omega\omega$	$1.2 \pm 0.4$	$1.2 \pm 0.3^{+0.3}_{-0.2}$		$< 19$			$1.2 \pm 0.4$
372	$\phi\pi^0$	$< 0.15$	$< 0.28$	$< 0.15$	$< 5$			$< 0.15$
373	$\phi\eta$	$< 0.5$	$< 0.5$		$< 9$			$< 0.5$
374	$\phi\eta'$	$< 0.5$	$< 1.1$	$< 0.5$	$< 31$			$< 0.5$
375	$\phi\rho^0$	$< 0.33$	$< 0.33$		$< 13$			$< 0.33$
376	$f_0(980)\phi \dagger$	$< 0.38$	$< 0.38$					$< 0.38$
377	$\omega\phi$	$< 0.7$	$< 0.7$		$< 21$			$< 0.7$
378	$\phi\phi$	$< 0.2$	$< 0.2$		$< 12$			$< 0.2$
379	$a_0^\mp(980)\pi^\pm \dagger$	$< 3.1$	$< 3.1$					$< 3.1$
379	$a_0^\mp(1450)\pi^\pm \dagger$	$< 2.3$	$< 2.3$					$< 2.3$
380	$a_0^\mp(1450)\pi^\pm \dagger$	$< 2.3$	$< 2.3$					$< 2.3$
382	$\rho^0\pi^0$	$2.0 \pm 0.5$	$1.4 \pm 0.6 \pm 0.3$	$3.0 \pm 0.5 \pm 0.7$	$1.6^{+2.0}_{-1.4} \pm 0.8$			$2.0 \pm 0.5$
383	$\rho^\mp\pi^\pm$	$23.0 \pm 2.3$	$22.6 \pm 1.8 \pm 2.2$	$22.6 \pm 1.1 \pm 4.4$	$27.6^{+8.4}_{-7.4} \pm 4.2$			$23.0 \pm 2.3$
384	$\pi^+\pi^-\pi^+\pi^-$	$< 19.3$	$< 23.1$	<span style="color: red;"><math>&lt; 11.2</math></span>				$< 11.2$
385	$\rho^0\pi^+\pi^-(NR)$	$< 8.8$	$< 8.8$	<span style="color: red;"><math>&lt; 12</math></span>				$< 8.8$
386	$\rho^0\rho^0$	$0.73 \pm 0.28$	$0.92 \pm 0.32 \pm 0.14$	<span style="color: red;"><math>1.02 \pm 0.30 \pm 0.15</math></span>	$< 18$			$0.97 \pm 0.24$
387	$f_0(980)\pi^+\pi^-(NR) \dagger$	$< 3.8$		<span style="color: red;"><math>&lt; 3.0</math></span>				$< 3.0$
388	$f_0(980)\rho^0 \dagger$	$< 0.3$	$< 0.40$	<span style="color: red;"><math>0.78 \pm 0.22 \pm 0.11</math></span>				$0.78 \pm 0.25$
389	$f_0(980)f_0(980) \dagger$	$< 0.1$	$< 0.19$	<span style="color: red;"><math>&lt; 0.2</math></span>				$< 0.19$
391	$a_1^\mp\pi^\pm$	$26 \pm 5$	$33.2 \pm 3.8 \pm 3.0$	$22.2 \pm 2.0 \pm 2.8$				$25.9 \pm 2.8$
392	$a_2^\mp\pi^\pm$	$< 6.3$		$< 6.3$				$< 6.3$
393	$\pi^+\pi^-\pi^0\pi^0$	$< 3100$	$< 3100$					$< 3100$
394	$\rho^+\rho^-$	$24.2 \pm 3.1$	$25.5 \pm 2.1^{+3.6}_{-3.9}$	$22.8 \pm 3.8^{+2.3}_{-2.6}$				$24.2^{+3.1}_{-3.2}$
395	$a_1(1260)^0\pi^0$	$< 1100$	$< 1100$					$< 1100$
396	$\omega\pi^0$	$< 0.5$	$< 0.5$	$< 2.0$	$< 5.5$			$< 0.5$
397	$\pi^+\pi^+\pi^-\pi^-\pi^0$	$< 9000$	$< 9000$					$< 9000$
398	$a_1^\pm\rho^\mp$	$< 61$	$< 61$					$< 61$
399	$a_1^\pm\rho^0$	$< 2400$	$< 2400$					$< 2400$
400	$b_1^\mp\pi^\pm \dagger$	$10.9 \pm 1.5$	$10.9 \pm 1.2 \pm 0.9$					$10.9 \pm 1.5$
401	$b_1^0\pi^0 \dagger$	$< 1.9$	$< 1.9$					$< 1.9$
402	$b_1^\pm\rho^\mp \dagger$	$< 1.4$	$< 1.4$					$< 1.4$
403	$b_1^0\rho^0 \dagger$	$< 3.4$	$< 3.4$					$< 3.4$
404	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	$< 3000$	$< 3000$					$< 3000$
405	$a_1^\pm a_1^\mp$	$11.8 \pm 2.6$	$11.8 \pm 2.6$					$11.8 \pm 2.6$
406	$\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	$< 11000$	$< 11000$					$< 11000$

$\dagger$  Product BF - daughter BF taken to be 100%,  $\ddagger$  Relative BF converted to absolute BF

Heavy Flavor Averaging Group  
August 2014

Compilation of  $B^0$  Relative Branching Fractions (UL 90% CL)

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

RPP#	Mode	PDG2014 Avg.	CDF	LHCb	New avg.
273	$\mathcal{B}(B^0 \rightarrow K^+K^-)/\mathcal{B}(B^0 \rightarrow K^+\pi^-)$		$0.012 \pm 0.005 \pm 0.005$		$0.012 \pm 0.007$
356	$\mathcal{B}(B^0 \rightarrow \pi^+\pi^-)/\mathcal{B}(B^0 \rightarrow K^+\pi^-)$	$0.261 \pm 0.010$	$0.259 \pm 0.017 \pm 0.016$	$0.262 \pm 0.009 \pm 0.017$	$0.261 \pm 0.015$
–	$\mathcal{B}(B^0 \rightarrow K^{*-}K^+)/\mathcal{B}(B^0 \rightarrow K^{*+}\pi^-)$	New		$< 0.05$	$< 0.05$

# Charmless Mesonic Decays:

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