Heavy Flavor Averaging Group
December 2011

Compilation of B^+ Semi-leptonic and Radiative Branching Fractions
All branching fractions are in units of 10^{-6}

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	PDG2010 Avg.	BABAR	Belle	CLEO	CDF	New Avg.
314	$K^{*+}\gamma$	42.1 ± 1.8	$42.2 \pm 1.4 \pm 1.6$	$42.5 \pm 3.1 \pm 2.4$	$37.6^{+8.9}_{-8.3} \pm 2.8$		42.1 ± 1.8
315	$K_1^+(1270)\gamma$	43 ± 13		$43 \pm 9 \pm 9$			43 ± 12
316	$K^+\eta\gamma$	7.9 ± 0.9	$7.7 \pm 1.0 \pm 0.4$	$8.4^{+1.5}_{-1.2} \pm 0.9$			7.9 ± 0.9
317	$K^+\eta'\gamma$	< 4.2	$1.9^{+1.5}_{-1.2} \pm 0.1$	$3.6 \pm 1.2 \pm 0.4$			$2.9^{+1.0}_{-0.9}$
318	$K^+\phi\gamma$	3.5 ± 0.6	$3.5 \pm 0.6 \pm 0.4$	$2.48 \pm 0.30 \pm 0.24$			2.71 ± 0.34
319	$K^+\pi^-\pi^+\gamma$	27.6 ± 2.2	$29.5 \pm 1.3 \pm 2.0$ †	$25.0 \pm 1.8 \pm 2.2$ ‡			27.6 ± 1.8
320	$K^{*0}\pi^+\gamma$ §	20^{+7}_{-6}		$20^{+7}_{-6} \pm 2$			20^{+7}_{-6}
321	$K^+\rho^0\gamma$ §	< 20		< 20			< 20
322	$K^+\pi^-\pi^+\gamma$ (N.R.) §	< 9.2		< 9.2			< 9.2
323	$K^0\pi^+\pi^0\gamma$	46 ± 5	$45.6 \pm 4.2 \pm 3.1$ †				45.6 ± 5.2
324	$K_1^+(1400)\gamma$	< 15		< 15			< 15
325	$K_2^*(1430)^+\gamma$	14 ± 4	$14.5 \pm 4.0 \pm 1.5$				14.5 ± 4.3
327	$K_3^*(1780)^+\gamma$	< 39		< 39			< 39
329	$\rho^+\gamma$	0.98 ± 0.25	$1.20^{+0.42}_{-0.37} \pm 0.20$	$0.87^{+0.29+0.09}_{-0.27-0.11}$	< 13		$0.98^{+0.25}_{-0.24}$
379	$p\overline{\Lambda}\gamma$	$2.5^{+0.5}_{-0.4}$		$2.45^{+0.44}_{-0.38} \pm 0.22$			$2.45^{+0.49}_{-0.44}$
383	$p\overline{\Sigma^0}\gamma$	< 4.6		< 4.6			< 4.6
412	$\pi^+\ell^+\ell^-$	< 0.049	< 0.12	< 0.049			< 0.049
413	$\pi^+e^+e^-$	< 0.080	< 0.18	< 0.080			< 0.080
414	$\pi^+\mu^+\mu^-$	< 0.069	< 0.28	< 0.069			< 0.069
415	$\pi^+\nu\overline{\nu}$	< 100	< 100	< 170			< 100
416	$K^+\ell^+\ell^-$	0.51 ± 0.05	$0.48 \pm 0.09 \pm 0.02$	$0.53^{+0.06}_{-0.05} \pm 0.03$			0.51 ± 0.05
417	$K^+e^+e^-$	0.55 ± 0.07	$0.51^{+0.12}_{-0.11} \pm 0.02$	$0.57^{+0.09}_{-0.08} \pm 0.03$	< 2.4		0.55 ± 0.07
418	$K^+\mu^+\mu^-$	0.52 ± 0.07	$0.41^{+0.16}_{-0.15} \pm 0.02$	$0.53 \pm 0.08^{+0.07}_{-0.03}$	< 3.68	$0.46 \pm 0.04 \pm 0.02$	0.47 ± 0.04
419	$K^+\nu\overline{\nu}$	< 14	< 13	< 14	< 240		< 13
420	$\rho^+\nu\overline{\nu}$	< 150		< 150			< 150
421	$K^{*+}\ell^+\ell^-$	1.29 ± 0.21	$1.40^{+0.40}_{-0.37} \pm 0.09$	$1.24^{+0.23}_{-0.21} \pm 0.13$			$1.29^{+0.22}_{-0.21}$
422	$K^{*+}e^+e^-$	$1.55^{+0.40}_{-0.31}$	$1.38^{+0.47}_{-0.42} \pm 0.08$	$1.73^{+0.50}_{-0.42} \pm 0.20$			$1.55^{+0.35}_{-0.32}$
423	$K^{*+}\mu^+\mu^-$	$1.16^{+0.31}_{-0.27}$	$1.46^{+0.79}_{-0.75} \pm 0.12$	$1.11^{+0.32}_{-0.27} \pm 0.10$		$0.95 \pm 0.32 \pm 0.08$	$1.07^{+0.22}_{-0.20}$
424	$K^{*+}\nu\overline{\nu}$	< 80	< 80	< 140			< 80
427	$\pi^+e^\pm\mu^\mp$	< 0.17	< 0.17				< 0.17
428	$K^+e^+\mu^-$	< 0.091	< 0.091				< 0.091
429	$K^+e^-\mu^+$	< 0.13	< 0.13				< 0.13
431	$K^+\tau^\pm\mu^\mp$	< 77	< 77				< 77
434	$K^{*+}e^\pm\mu^\mp$	< 1.4	< 1.4				< 1.4
435	$\pi^-e^+e^+$	< 1.6			< 1.6		< 1.6
436	$\pi^-\mu^+\mu^+$	< 1.4			< 1.4		< 1.4
437	$\pi^-e^+\mu^+$	< 1.3			< 1.3		< 1.3
438	$\rho^-e^+e^+$	< 2.6			< 2.6		< 2.6
439	$\rho^-\mu^+\mu^+$	< 5.0			< 5.0		< 5.0
443	$\rho^-e^+\mu^+$	< 3.3			< 3.3		< 3.3
441	$K^-e^+e^+$	< 1.0			< 1.0		< 1.0
442	$K^-\mu^+\mu^+$	< 1.8			< 1.8		< 1.8
443	$K^-e^+\mu^+$	< 2.0			< 2.0		< 2.0
444	$K^{*-}e^+e^+$	< 2.8			< 2.8		< 2.8
445	$K^{*-}\mu^+\mu^+$	< 8.3			< 8.3		< 8.3
446	$K^{*-}e^+\mu^+$	< 4.4			< 4.4		< 4.4

†$M_{K\pi\pi} < 1.8$ GeV/c^2; ‡ $1.0 < M_{K\pi\pi} < 2.0$ GeV/c^2; § $M_{K\pi\pi} < 2.4$ GeV/c^2

Heavy Flavor Averaging Group
December 2011

Compilation of B^0 Semi-leptonic and Radiative Branching Fractions
All branching fractions are in units of 10^{-6}

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	PDG2010 Avg.	BABAR	Belle	CLEO	CDF	New Avg.
297	$K^0\eta\gamma$	7.6 ± 1.8	$7.1^{+2.1}_{-2.0} \pm 0.4$	$8.7^{+3.1+1.9}_{-2.7-1.6}$			$7.6^{+1.8}_{-1.7}$
298	$K^0\eta'\gamma$	< 6.6	< 6.6	< 6.4			< 6.4
299	$K^0\phi\gamma$	< 2.7	< 2.7	$2.74 \pm 0.60 \pm 0.32$			2.74 ± 0.68
300	$K^+\pi^-\gamma$ §	4.6 ± 1.4		$4.6^{+1.3+0.5}_{-1.2-0.7}$			4.6 ± 1.4
301	$K^{*0}\gamma$	43.3 ± 1.5	$44.7 \pm 1.0 \pm 1.6$	$40.1 \pm 2.1 \pm 1.7$	$45.5^{+7.2}_{-6.8} \pm 3.4$		43.3 ± 1.5
302	$K^*(1410)^0\gamma$	< 130		< 130			< 130
303	$K^+\pi^-\gamma$ (N.R.) §	< 2.6		< 2.6			< 2.6
304	$K^0\pi^+\pi^-\gamma$	19.5 ± 2.2	$18.5 \pm 2.1 \pm 1.2$ †	$24 \pm 4 \pm 3$ ‡			19.5 ± 2.2
305	$K^+\pi^-\pi^0\gamma$	41 ± 4	$40.7 \pm 2.2 \pm 3.1$ †				40.7 ± 3.8
306	$K_1^0(1270)\gamma$	< 58		< 58			< 58
307	$K_1^0(1400)\gamma$	< 15		< 15			< 15
308	$K_2^*(1430)^0\gamma$	12.4 ± 2.4	$12.2 \pm 2.5 \pm 1.0$	$13 \pm 5 \pm 1$			12.4 ± 2.4
310	$K_3^*(1780)^0\gamma$	< 83		< 83			< 83
312	$\rho^0\gamma$	0.86 ± 0.15	$0.97^{+0.24}_{-0.22} \pm 0.06$	$0.78^{+0.17+0.09}_{-0.16-0.10}$	< 17		$0.86^{+0.15}_{-0.14}$
313	$\omega\gamma$	$0.44^{+0.18}_{-0.16}$	$0.50^{+0.27}_{-0.23} \pm 0.09$	$0.40^{+0.19}_{-0.17} \pm 0.13$	< 9.2		$0.44^{+0.18}_{-0.16}$
314	$\phi\gamma$	< 0.85	< 0.85		< 3.3		< 0.85
418	$\pi^0\ell^+\ell^-$	< 0.12	< 0.12	< 0.154			< 0.12
419	$\pi^0e^+e^-$	< 0.14	< 0.14	< 0.227			< 0.14
420	$\pi^0\mu^+\mu^-$	< 1.8	< 0.51	< 0.184			< 0.184
421	$\pi^0\nu\overline{\nu}$	< 220		< 220			< 220
422	$K^0\ell^+\ell^-$	$0.31^{+0.08}_{-0.07}$	$0.21^{+0.15}_{-0.13} \pm 0.02$	$0.34^{+0.09}_{-0.08} \pm 0.02$			$0.31^{+0.08}_{-0.07}$
423	$K^0e^+e^-$	$0.16^{+0.10}_{-0.08}$	$0.08^{+0.15}_{-0.12} \pm 0.01$	$0.20^{+0.14}_{-0.10} \pm 0.01$	< 8.45		$0.16^{+0.10}_{-0.08}$
424	$K^0\mu^+\mu^-$	$0.45^{+0.12}_{-0.10}$	$0.49^{+0.29}_{-0.25} \pm 0.03$	$0.44^{+0.13}_{-0.10} \pm 0.03$	< 6.64	$0.32 \pm 0.10 \pm 0.02$	0.38 ± 0.07
425	$K^0\nu\overline{\nu}$	< 160	< 56	< 160			< 56
426	$\rho^0\nu\overline{\nu}$	< 440		< 440			< 440
427	$K^{*0}\ell^+\ell^-$	$0.99^{+0.12}_{-0.11}$	$1.03^{+0.22}_{-0.21} \pm 0.07$	$0.97^{+0.13}_{-0.11} \pm 0.07$			$0.99^{+0.13}_{-0.11}$
428	$K^{*0}e^+e^-$	$1.03^{+0.19}_{-0.17}$	$0.86^{+0.26}_{-0.24} \pm 0.05$	$1.18^{+0.27}_{-0.22} \pm 0.09$			$1.03^{+0.19}_{-0.17}$
429	$K^{*0}\mu^+\mu^-$	$1.05^{+0.16}_{-0.13}$	$1.35^{+0.40}_{-0.37} \pm 0.10$	$1.06^{+0.19}_{-0.14} \pm 0.07$		$1.02 \pm 0.10 \pm 0.06$	$1.05^{+0.10}_{-0.09}$
430	$K^{*0}\nu\overline{\nu}$	< 120	< 120	< 340			< 120
431	$\phi\nu\overline{\nu}$	< 58		< 58			< 58
433	$\pi^0e^\pm\mu^\mp$	< 0.14	< 0.14				< 0.14
434	$K^0e^\pm\mu^\mp$	< 0.27	< 0.27				< 0.27
437	$K^{*0}e^\pm\mu^\mp$	< 5.8	< 0.58				< 0.58

† $M_{K\pi\pi} < 1.8$ GeV/c^2; ‡ $1.0 < M_{K\pi\pi} < 2.0$ GeV/c^2; § 1.25 GeV/$c^2 < M_{K\pi} < 1.6$ GeV/c^2

Heavy Flavor Averaging Group
December 2011

Compilation of B Semi-leptonic and Radiative Branching Fractions

All branching fractions are in units of 10^{-6}

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	PDG2010 Avg.	BABAR	Belle	CLEO	New Avg.
66	$K\eta\gamma$	$8.5^{+1.8}_{-1.6}$		$8.5^{+1.3}_{-1.2} \pm 0.9$		$8.5^{+1.6}_{-1.5}$
68	$K_2^*(1430)\gamma$	$1.7^{+0.6}_{-0.5}$			$1.7 \pm 0.6 \pm 0.1$	1.7 ± 0.6
70	$K_3^*(1780)\gamma$	< 37		< 2.8		< 2.8
77	$s\gamma$	360 ± 23	$327 \pm 18^{+55}_{-41}$	$345 \pm 15 \pm 40$	$321 \pm 43^{+32}_{-29}$	$355 \pm 24 \pm 9$
78	$d\gamma$	12 ± 6	$9.2 \pm 2.0 \pm 2.3$			9.2 ± 3.0
82	$\rho\gamma$	1.39 ± 0.25	$1.73^{+0.34}_{-0.32} \pm 0.17$	$1.21^{+0.24}_{-0.22} \pm 0.12$	< 14	$1.39^{+0.22}_{-0.21}$
83	$\rho/\omega\gamma$	1.39 ± 0.23	$1.63^{+0.30}_{-0.28} \pm 0.16$	$1.14 \pm 0.20^{+0.10}_{-0.12}$	< 14	$1.30^{+0.18}_{-0.19}$
113	se^+e^- ‡	4.7 ± 1.3	$6.0 \pm 1.7 \pm 1.3$	$4.56 \pm 1.15^{+0.33}_{-0.40}$	< 57	$4.91^{+1.04}_{-1.06}$
114	$s\mu^+\mu^-$	4.3 ± 1.2	$5.0 \pm 2.8 \pm 1.2$	$1.91 \pm 1.02^{+0.16}_{-0.18}$	< 58	$2.23^{+0.97}_{-0.98}$
115	$s\ell^+\ell^-$ ‡	4.5 ± 1.0	$5.6 \pm 1.5 \pm 1.3$	$3.33 \pm 0.80^{+0.19}_{-0.24}$	< 42	$3.66^{+0.76}_{-0.77}$
116	$\pi\ell^+\ell^-$	< 0.062	< 0.091	< 0.062		< 0.062
117	Ke^+e^-	0.44 ± 0.06	$0.39^{+0.09}_{-0.08} \pm 0.02$	$0.48^{+0.08}_{-0.07} \pm 0.03$		0.44 ± 0.06
118	$K^*e^+e^-$	1.19 ± 0.20	$0.99^{+0.23}_{-0.21} \pm 0.06$	$1.39^{+0.23}_{-0.20} \pm 0.12$		$1.19^{+0.17}_{-0.16}$
119	$K\mu^+\mu^-$	0.48 ± 0.06	$0.41^{+0.13}_{-0.12} \pm 0.02$	$0.50 \pm 0.06 \pm 0.03$		0.48 ± 0.06
120	$K^*\mu^+\mu^-$	1.15 ± 0.15	$1.35^{+0.35}_{-0.33} \pm 0.10$	$1.10^{+0.16}_{-0.14} \pm 0.08$		$1.15^{+0.16}_{-0.15}$
121	$K\ell^+\ell^-$	0.45 ± 0.04	$0.39 \pm 0.07 \pm 0.02$	$0.48^{+0.05}_{-0.04} \pm 0.03$	< 1.7	0.45 ± 0.04
122	$K^*\ell^+\ell^-$	1.08 ± 0.11	$1.11^{+0.19}_{-0.18} \pm 0.07$	$1.07^{+0.11}_{-0.10} \pm 0.09$	< 3.3	$1.08^{+0.12}_{-0.11}$
–	$K\nu\bar{\nu}$	New	< 14			< 14
123	$K^*\nu\bar{\nu}$	< 80	< 80			< 80
125	$\pi e^\pm\mu^\mp$	< 0.092	< 0.092		< 1.6	< 0.092
126	$\rho e^\pm\mu^\mp$	< 3.2			< 3.2	< 3.2
127	$Ke^\pm\mu^\mp$	< 0.038	< 0.038		< 1.6	< 0.038
128	$K^*e^\pm\mu^\mp$	< 0.51	< 0.51		< 6.2	< 0.51
–	$s\gamma$ with baryons	New			< 38 †	< 38 †

†$E_\gamma > 2.0$ GeV; ‡$M(\ell^+\ell^-) > 0.2$ GeV/c^2

Heavy Flavor Averaging Group
December 2011
Isospin Asymmetry

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Parameter	PDG2010 Avg.	BABAR	Belle	New Avg.
65	$\Delta_{0^-}(K^*\gamma)$	0.066 ± 0.030	$0.066 \pm 0.021 \pm 0.022$	$0.012 \pm 0.044 \pm 0.026$	0.052 ± 0.026
77	$\Delta_{0^-}(X_s\gamma)$	-0.01 ± 0.06	-0.01 ± 0.06		-0.01 ± 0.06
82	$\Delta_{\rho\gamma}$	-0.46 ± 0.17	$-0.43^{+0.25}_{-0.22} \pm 0.10$	$-0.48^{+0.21+0.08}_{-0.19-0.09}$	$-0.46^{+0.17}_{-0.16}$
121	$\Delta_{0-}(K\ell\ell)\dagger$	$-0.40^{+0.34}_{-0.30}$	$-1.43^{+0.56}_{-0.85} \pm 0.05$	$-0.31^{+0.17}_{-0.14} \pm 0.08$	$-0.40^{+0.16}_{-0.15}$
122	$\Delta_{0-}(K^*\ell\ell)\dagger$	-0.44 ± 0.13	$-0.56^{+0.17}_{-0.15} \pm 0.03$	$-0.29 \pm 0.16 \pm 0.09$	$-0.44^{+0.13}_{-0.12}$
	$\Delta_{0-}(K^{(*)}\ell\ell)\dagger$	-0.45 ± 0.17	$-0.64^{+0.15}_{-0.14} \pm 0.03$	$-0.30^{+0.12}_{-0.11} \pm 0.08$	-0.45 ± 0.10

$\dagger m_{\ell\ell} < m_{J/\psi}$

Heavy Flavor Averaging Group
December 2011
Partial Branching Fraction

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

All branching fractions are in units of 10^{-7}

RPP#	Mode	q^2 [(GeV/c^2)^2] †	PDG2010 Avg.	BABAR	Belle	CDF ‡	LHCb ‡	New Avg.
121	$K\ell^+\ell^-$	< 2.0			$0.81^{+0.18}_{-0.16} \pm 0.05$	$0.33 \pm 0.10 \pm 0.02$		0.46 ± 0.09
	$K\ell^+\ell^-$	$[2.0, 4.3]$			$0.46^{+0.14}_{-0.12} \pm 0.03$	$0.77 \pm 0.14 \pm 0.05$		0.61 ± 0.10
	$K\ell^+\ell^-$	$[4.3, 8.68]$			$1.00^{+0.19}_{-0.18} \pm 0.06$	$1.05 \pm 0.17 \pm 0.07$		$1.03^{+0.14}_{-0.13}$
	$K\ell^+\ell^-$	$[10.09, 12.86]$			$0.55^{+0.16}_{-0.14} \pm 0.03$	$0.48 \pm 0.10 \pm 0.03$		$0.50^{+0.09}_{-0.08}$
	$K\ell^+\ell^-$	$[14.18, 16.00]$			$0.38^{+0.19}_{-0.12} \pm 0.02$	$0.52 \pm 0.09 \pm 0.03$		$0.49^{+0.09}_{-0.08}$
	$K\ell^+\ell^-$	> 16.00			$0.98^{+0.20}_{-0.18} \pm 0.06$	$0.38 \pm 0.09 \pm 0.02$		0.49 ± 0.08
122	$K^*\ell^+\ell^-$	< 2.0			$1.46^{+0.40}_{-0.35} \pm 0.11$	$1.73 \pm 0.33 \pm 0.10$	$0.56 \pm 0.11 \pm 0.03$	0.74 ± 0.10
	$K^*\ell^+\ell^-$	$[2.0, 4.3]$			$0.86^{+0.31}_{-0.27} \pm 0.07$	$0.82 \pm 0.26 \pm 0.06$	$0.28 \pm 0.08 \pm 0.02$	0.37 ± 0.08
	$K^*\ell^+\ell^-$	$[4.3, 8.68]$			$1.37^{+0.47}_{-0.42} \pm 0.39$	$1.72 \pm 0.41 \pm 0.14$	$0.55 \pm 0.07 \pm 0.03$	0.60 ± 0.07
	$K^*\ell^+\ell^-$	$[10.09, 12.86]$			$2.24^{+0.44}_{-0.40} \pm 0.19$	$1.77 \pm 0.34 \pm 0.11$	$0.53 \pm 0.09 \pm 0.03$	0.68 ± 0.09
	$K^*\ell^+\ell^-$	$[14.18, 16.00]$			$1.05^{+0.29}_{-0.26} \pm 0.08$	$1.21 \pm 0.24 \pm 0.07$	$0.59 \pm 0.10 \pm 0.03$	0.72 ± 0.09
	$K^*\ell^+\ell^-$	> 16.00			$2.04^{+0.27}_{-0.24} \pm 0.16$	$0.88 \pm 0.22 \pm 0.05$	$0.48 \pm 0.08 \pm 0.03$	0.64 ± 0.08

† see the original paper for the exact q^2 selection. ‡ muon mode only ($\ell = \mu$).

Heavy Flavor Averaging Group
December 2011
Forward-backward Asymmetry ($A_{\rm FB}$)

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	q^2 [(GeV/c^2)^2] †	PDG2010 Avg.	BABAR	Belle	CDF ‡	LHCb ‡	New Avg.
121	$K\ell^+\ell^-$	< 2.0	$0.06^{+0.32}_{-0.35} \pm 0.02$		$0.06^{+0.32}_{-0.35} \pm 0.02$	$0.13^{+0.42}_{-0.43} \pm 0.07$		$0.08^{+0.20}_{-0.22}$
	$K\ell^+\ell^-$	$[2.0, 4.3]$	$-0.43^{+0.38}_{-0.40} \pm 0.09$		$-0.43^{+0.38}_{-0.40} \pm 0.09$	$0.32^{+0.15}_{-0.16} \pm 0.05$		0.12 ± 0.14
	$K\ell^+\ell^-$	$[4.3, 8.68]$	$-0.20^{+0.12}_{-0.14} \pm 0.03$		$-0.20^{+0.12}_{-0.14} \pm 0.03$	$0.01^{+0.13}_{-0.10} \pm 0.01$		$-0.11^{+0.06}_{-0.07}$
	$K\ell^+\ell^-$	$[10.09, 12.86]$			$-0.21^{+0.17}_{-0.15} \pm 0.06$	$-0.03^{+0.11}_{-0.10} \pm 0.04$		$-0.08^{+0.10}_{-0.09}$
	$K\ell^+\ell^-$	$[14.18, 16.00]$			$0.04^{+0.32}_{-0.26} \pm 0.05$	$-0.05^{+0.09}_{-0.11} \pm 0.03$		$-0.04^{+0.09}_{-0.10}$
	$K\ell^+\ell^-$	> 16.00			$0.02^{+0.11}_{-0.08} \pm 0.02$	$0.09^{+0.17}_{-0.13} \pm 0.03$		$0.04^{+0.09}_{-0.07}$
122	$K^*\ell^+\ell^-$	< 2.0	$0.47^{+0.26}_{-0.32} \pm 0.03$		$0.47^{+0.26}_{-0.32} \pm 0.03$	$-0.35^{+0.26}_{-0.23} \pm 0.10$	$-0.17^{+0.22}_{-0.23} \pm 0.06$	0.03 ± 0.14
	$K^*\ell^+\ell^-$	$[2.0, 4.3]$	$0.11^{+0.31}_{-0.36} \pm 0.07$		$0.11^{+0.31}_{-0.36} \pm 0.07$	$0.29^{+0.32}_{-0.35} \pm 0.15$	$-0.04^{+0.19}_{-0.15} \pm 0.06$	$0.05^{+0.15}_{-0.14}$
	$K^*\ell^+\ell^-$	$[4.3, 8.68]$	$0.45^{+0.15}_{-0.21} \pm 0.15$		$0.45^{+0.15}_{-0.21} \pm 0.15$	$0.01^{+0.20}_{-0.20} \pm 0.09$	$0.28^{+0.06}_{-0.08} \pm 0.02$	$0.28^{+0.06}_{-0.07}$
	$K^*\ell^+\ell^-$	$[10.09, 12.86]$			$0.43^{+0.18}_{-0.20} \pm 0.03$	$0.38^{+0.16}_{-0.19} \pm 0.09$	$0.27^{+0.11}_{-0.13} \pm 0.03$	$0.33^{+0.09}_{-0.10}$
	$K^*\ell^+\ell^-$	$[14.18, 16.00]$			$0.70^{+0.16}_{-0.22} \pm 0.10$	$0.44^{+0.18}_{-0.21} \pm 0.10$	$0.50^{+0.06}_{-0.09} \pm 0.03$	$0.51^{+0.06}_{-0.08}$
	$K^*\ell^+\ell^-$	> 16.00			$0.66^{+0.11}_{-0.16} \pm 0.04$	$0.65^{+0.17}_{-0.18} \pm 0.16$	$0.10^{+0.13}_{-0.13} \pm 0.06$	0.39 ± 0.10

† see the original paper for the exact q^2 selection. ‡ muon mode only ($\ell = \mu$).

Heavy Flavor Averaging Group
December 2011
Fraction of the Longitudinal Polarization (F_L)

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	q^2 [(GeV/c^2)^2] †	PDG2010 Avg.	BABAR	Belle	CDF ‡	LHCb ‡	New Avg.
122	$K^*\ell^+\ell^-$	< 2.0	$0.29^{+0.21}_{-0.18} \pm 0.02$		$0.29^{+0.21}_{-0.18} \pm 0.02$	$0.30^{+0.16}_{-0.16} \pm 0.02$	$0.03^{+0.15}_{-0.03} \pm 0.06$	$0.22^{+0.09}_{-0.08}$
	$K^*\ell^+\ell^-$	$[2.0, 4.3]$	$0.71 \pm 0.24 \pm 0.05$		$0.71 \pm 0.24 \pm 0.05$	$0.37^{+0.25}_{-0.24} \pm 0.10$	$0.84^{+0.15}_{-0.13} \pm 0.06$	0.73 ± 0.10
	$K^*\ell^+\ell^-$	$[4.3, 8.68]$	$0.64^{+0.23}_{-0.24} \pm 0.07$		$0.64^{+0.23}_{-0.24} \pm 0.07$	$0.68^{+0.15}_{-0.17} \pm 0.09$	$0.60 \pm 0.07 \pm 0.01$	0.61 ± 0.06
	$K^*\ell^+\ell^-$	$[10.09, 12.86]$			$0.17^{+0.17}_{-0.15} \pm 0.03$	$0.47^{+0.14}_{-0.14} \pm 0.03$	$0.44^{+0.12}_{-0.11} \pm 0.02$	0.39 ± 0.08
	$K^*\ell^+\ell^-$	$[14.18, 16.00]$			$-0.15^{+0.27}_{-0.23} \pm 0.07$	$0.29^{+0.14}_{-0.13} \pm 0.05$	$0.33^{+0.11}_{-0.08} \pm 0.04$	$0.28^{+0.08}_{-0.07}$
	$K^*\ell^+\ell^-$	> 16.00			$0.12^{+0.15}_{-0.13} \pm 0.02$	$0.20^{+0.19}_{-0.17} \pm 0.05$	$0.28^{+0.10}_{-0.09} \pm 0.04$	$0.22^{+0.08}_{-0.07}$

† see the original paper for the exact q^2 selection. ‡ muon mode only ($\ell = \mu$).

Heavy Flavor Averaging Group
December 2011
Compilation of B Inclusive Branching Fractions
All branching fractions are in units of 10^{-6}

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	PDG2010 Avg.	BABAR	Belle	CLEO	New Avg.
–	K^+X	New	< 187†			< 187†
–	K^0X	New	$195^{+51}_{-45} \pm 50$†			195^{+71}_{-67}
–	π^+X	New	$372^{+50}_{-47} \pm 59$†			372^{+77}_{-75}
80	$s\eta$	< 440		$261 \pm 30^{+44}_{-74}$ §	< 440	261^{+53}_{-79}
81	$s\eta'$	420 ± 90	$390 \pm 80 \pm 90$‡		$460 \pm 110 \pm 60$‡	423 ± 86

† $p^* > 2.34$ GeV; § $0.4 < M_{X_s} < 2.6$ GeV; ‡ $2.0 < p^* < 2.7$ GeV

Heavy Flavor Averaging Group

December 2011

Compilation of B Leptonic Branching Fractions

All branching fractions are in units of 10^{-6}

In PDG2010 New since PDG2010 (preliminary) New since PDG2010 (published)

RPP#	Mode	PDG2010 Avg.	BABAR	Belle	CLEO	CDF	DØ	LHCb	CMS	New Avg.
24	$e^+\nu$	< 1.9	< 1.9	< 1.0	< 15					< 1.0
25	$\mu^+\nu$	< 1.0	< 1.0	< 1.7	< 21					< 1.0
26	$\tau^+\nu$	180 ± 50	176 ± 49	162^{+31+25}_{-30-26}†	< 840					167 ± 30
27	$\ell^+\nu_\ell\gamma$	< 15.6	< 15.6							< 15.6
28	$e^+\nu_e\gamma$	< 17	< 17		< 200					< 17
29	$\mu^+\nu_\mu\gamma$	< 24	< 26		< 52					< 26
412	$\gamma\gamma$	< 0.62	< 0.32	< 0.62						< 0.32
413	e^+e^-	< 0.083	< 0.113	< 0.19	< 0.83	< 0.083				< 0.083
414	$e^+e^-\gamma$	< 0.12	< 0.12							< 0.12
415	$\mu^+\mu^-$	< 0.015	< 0.052	< 0.16	< 0.61	< 0.0050		< 0.0026	< 0.0037	< 0.0026
416	$\mu^+\mu^-\gamma$	< 0.16	< 0.16							< 0.16
417	$\tau^+\tau^-$	< 4100	< 4100							< 4100
432	$e^\pm\mu^\mp$	< 0.064	< 0.092	< 0.17	< 1.5	< 0.064				< 0.064
438	$e^\pm\tau^\mp$	< 28	< 28		< 110					< 28
439	$\mu^\pm\tau^\mp$	< 22	< 22		< 38					< 22
440	$\nu\bar{\nu}$	< 220	< 220	< 130						< 130
441	$\nu\bar{\nu}\gamma$	< 47	< 47							< 47

†This result has been averaged with the earlier PRL 97, 251802 (2006).

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