

Heavy FLavor AVeraging group (HFLAV) - April 2019  
 Compilation of  $B^+$  Baryonic Branching Fractions ( $\times 10^{-6}$ ) - UL at 90% CL  
 Preliminary Updated results not included in PDG Live as of Dec. 31, 2017

RPP#	Mode	PDG2017 Avg.	BABAR	Belle	LHCb	Our Avg.
484	$p\bar{p}\pi^+$	$1.62 \pm 0.20$	$1.69 \pm 0.29 \pm 0.26$ †[1]	$1.60_{-0.19}^{+0.22} \pm 0.12$ [2]		$1.62_{-0.20}^{+0.21}$
484	$p\bar{p}\pi^+$ §				$1.07 \pm 0.11 \pm 0.11$ [3]	$1.07 \pm 0.16$
487	$p\bar{p}K^+$	$5.9 \pm 0.5$	$6.7 \pm 0.5 \pm 0.4$ † [4]	$5.54_{-0.25}^{+0.27} \pm 0.36$ [2]	<b><math>4.46 \pm 0.21 \pm 0.27</math> ¶ [5]</b>	$5.14 \pm 0.25$
488	$\Theta^{++}\bar{p}$ <sup>1</sup>	$< 0.091$	$< 0.09$ [4]	$< 0.091$ [6]		$< 0.09$
489	$f_J(2220)K^{+2}$	$< 0.41$		$< 0.41$ [6]		$< 0.41$
490	$p\bar{\Lambda}(1520)$	$0.31 \pm 0.06$	$< 1.5$ [4]		$0.315 \pm 0.048 \pm 0.027$ [3]	$0.315 \pm 0.055$
492	$p\bar{p}K^{*+}$	$3.6_{-0.7}^{+0.8}$	$5.3 \pm 1.5 \pm 1.3$ † [1]	$3.38_{-0.60}^{+0.73} \pm 0.39$ ‡ [7]		$3.64_{-0.70}^{+0.79}$
493	$f_J(2220)K^{*+2}$	$< 0.77$	$< 0.77$ [1]			$< 0.77$
494	$p\bar{\Lambda}$	$< 0.32$		$< 0.32$ [8]	<b><math>0.24_{-0.08}^{+0.10} \pm 0.03</math> [9]</b>	$0.24_{-0.09}^{+0.10}$
496	$p\bar{\Lambda}\pi^0$	$3.00_{-0.6}^{+0.7}$		$3.00_{-0.53}^{+0.61} \pm 0.33$ [10]		$3.00_{-0.62}^{+0.69}$
497	$p\bar{\Sigma}(1385)^0$	$< 0.47$		$< 0.47$ [10]		$< 0.47$
498	$\Delta^+\bar{\Lambda}$	$< 0.82$		$< 0.82$ [10]		$< 0.82$
500	$p\bar{\Lambda}\pi^+\pi^-$ (NR)	$5.9 \pm 1.1$		$5.92_{-0.84}^{+0.88} \pm 0.69$ [11]		$5.92_{-1.09}^{+1.12}$
501	$p\bar{\Lambda}\rho^0$	$4.8 \pm 0.9$		$4.78_{-0.64}^{+0.67} \pm 0.60$ [11]		$4.78_{-0.88}^{+0.90}$
502	$p\bar{\Lambda}f_2(1270)$	$2.0 \pm 0.8$		$2.03_{-0.72}^{+0.77} \pm 0.27$ [11]		$2.03_{-0.77}^{+0.82}$
503	$\Lambda\bar{\Lambda}\pi^+$	$< 0.94$		$< 0.94$ § [12]		$< 0.94$ §
504	$\Lambda\bar{\Lambda}K^+$	$3.4 \pm 0.6$		$3.38_{-0.36}^{+0.41} \pm 0.41$ ‡ [12]		$3.38_{-0.55}^{+0.58}$
505	$\Lambda\bar{\Lambda}K^{*+}$	$2.2_{-0.9}^{+1.2}$		$2.19_{-0.88}^{+1.13} \pm 0.33$ § [12]		$2.19_{-0.94}^{+1.18}$
506	$\bar{\Delta}^0 p$	$< 1.38$		$< 1.38$ § [2]		$< 1.38$ §
507	$\Delta^{++}\bar{p}$	$< 0.14$		$< 0.14$ § [2]		$< 0.14$ §
	$p\bar{\Lambda}K^+K^-$ (NR)			$4.10_{-0.43}^{+0.45} \pm 0.50$ [13]		$4.10_{-0.66}^{+0.67}$
	$\bar{p}\Lambda K^+K^-$ (NR)			$3.70_{-0.37}^{+0.39} \pm 0.44$ [13]		$3.70_{-0.57}^{+0.59}$
	$p\bar{\Lambda}\phi$			$0.795 \pm 0.209 \pm 0.077$ [13]		$0.795 \pm 0.223$
	$\Lambda(1520)\bar{\Lambda}K^+$			$2.23 \pm 0.63 \pm 0.25$ [13]		$2.23 \pm 0.68$
	$\bar{\Lambda}(1520)\Lambda K^+$			$< 2.08$ [13]		$< 2.08$

Channels with no RPP# were not included in PDG Live as of Dec. 31, 2017.

Results for LHCb are relative BF's converted to absolute BF's.

† Charmonium decays to  $p\bar{p}$  have been statistically subtracted.

‡ The charmonium mass region has been vetoed.

§ Di-baryon mass is less than 2.85 GeV/c<sup>2</sup>.

¶ Includes contribution where  $p\bar{p}$  is produced in charmonia decays.

<sup>1</sup>  $\Theta(1540)^{++} \rightarrow K^+p$  (pentaquark candidate).

<sup>2</sup> In this product of BF's, all daughter BF's not shown are set to 100%.

Heavy FLavor AVeraging group (HFLAV) - April 2019  
 Compilation of  $B^0$  Baryonic Branching Fractions ( $\times 10^{-6}$ ) - UL at 90% CL  
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RPP#	Mode	PDG2017 Avg.	BABAR	Belle	LHCb	Our Avg.
439	$p\bar{p}$	$0.015^{+0.007}_{-0.005}$	$< 0.27$ [14]	$< 0.11$ [8]	$0.0125 \pm 0.0027 \pm 0.0018$ [15]	$0.0130 \pm 0.0030$
440	$p\bar{p}\pi^+\pi^-$	$< 250$			$2.7 \pm 0.1 \pm 0.1 \pm 0.2$ [16]	$2.7 \pm 0.2$
441	$p\bar{p}K^0$	$2.66 \pm 0.32$	$3.0 \pm 0.5 \pm 0.3$ † [1]	$2.51^{+0.35}_{-0.29} \pm 0.21$ ‡ [7]		$2.66^{+0.34}_{-0.32}$
442	$\Theta^+\bar{p}$ §	$< 0.05$	$< 0.05$ [1]	$< 0.23$ [6]		$< 0.05$
443	$f_J(2220)K^0$ ¶	$< 0.45$	$< 0.45$ [1]			$< 0.45$
444	$p\bar{p}K^{*0}$	$1.24^{+0.28}_{-0.25}$	$1.47 \pm 0.45 \pm 0.40$ † [1]	$1.18^{+0.29}_{-0.25} \pm 0.11$ ‡ [7]		$1.24^{+0.28}_{-0.25}$
445	$f_J(2220)K^{*0}$ ¶	$< 0.15$	$< 0.15$ [1]			$< 0.15$
446	$p\bar{\Lambda}\pi^-$	$3.14 \pm 0.29$	$3.07 \pm 0.31 \pm 0.23$ [17]	$3.23^{+0.33}_{-0.29} \pm 0.29$ [10]		$3.14^{+0.29}_{-0.28}$
448	$p\bar{\Sigma}(1385)^-$	$< 0.26$		$< 0.26$ [10]		$< 0.26$
449	$\Delta^0\bar{\Lambda}$	$< 0.93$		$< 0.93$ [10]		$< 0.93$
450	$p\bar{\Lambda}K^-$	$< 0.82$		$< 0.82$ [18]		$< 0.82$
453	$p\bar{\Sigma}^0\pi^-$	$< 3.8$		$< 3.8$ [18]		$< 3.8$
454	$\bar{\Lambda}\Lambda$	$< 0.32$		$< 0.32$ [8]		$< 0.32$
455	$\bar{\Lambda}\Lambda K^0$	$4.8^{+1.0}_{-0.9}$		$4.76^{+0.84}_{-0.68} \pm 0.61$ ‡ [12]		$4.76^{+1.04}_{-0.91}$
456	$\Lambda\bar{\Lambda}K^{*0}$	$2.5^{+0.9}_{-0.8}$		$2.46^{+0.87}_{-0.72} \pm 0.34$ ‡ [12]		$2.46^{+0.93}_{-0.80}$
	$p\bar{p}K^+K^-$				$0.113 \pm 0.028 \pm 0.011 \pm 0.008$ [16]	$0.113 \pm 0.031$
	$p\bar{p}K^+\pi^-$				$5.9 \pm 0.3 \pm 0.3 \pm 0.4$ [16]	$5.9 \pm 0.6$
	$p\bar{p}\bar{p}\bar{p}$		$< 0.20$ [19]			$< 0.20$
	$p\bar{p}\pi^0$			$0.50^{+0.18}_{-0.06}$ [20]		$0.50^{+0.18}_{-0.06}$
	$\Delta^+\bar{p} + \bar{\Delta}^-p$			$< 1.6$ [20]		$< 1.6$

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Results for LHCb are relative BF's converted to absolute BF's.

† Charmonium decays to  $p\bar{p}$  have been statistically subtracted.

‡ The charmonium mass region has been vetoed.

§  $\Theta(1540)^+ \rightarrow pK^0$  (pentaquark candidate).

¶ In this product of BF's, all daughter BF's not shown are set to 100%.

Heavy FLavor AVeraging group (HFLAV) - April 2019  
 Compilation of  $B^+$  and  $B^0$  Baryonic Relative Branching Fractions  
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RPP#	Mode	PDG2017 Avg.	LHCb	Our Avg.
	$\mathcal{B}(B^+ \rightarrow p\bar{p}\pi^+, m_{p\bar{p}} < 2.85 \text{ GeV}/c^2)/\mathcal{B}(B^+ \rightarrow J/\psi(\rightarrow p\bar{p})\pi^+)$		$12.0 \pm 1.2 \pm 0.3$ [3]	$12.0 \pm 1.2$
	$\mathcal{B}(B^+ \rightarrow p\bar{p}K^+)/\mathcal{B}(B^+ \rightarrow J/\psi(\rightarrow p\bar{p})K^+)$		$4.91 \pm 0.19 \pm 0.14$ † [5]	$4.91 \pm 0.24$
487	$\mathcal{B}(B^+ \rightarrow p\bar{p}K^+)/\mathcal{B}(B^+ \rightarrow J/\psi K^+)$	$0.0104 \pm 0.0005 \pm 0.0001$	$0.0104 \pm 0.0005 \pm 0.0001$ †† [5]	$0.0100 \pm 0.0010$
	$\mathcal{B}(B^+ \rightarrow \bar{\Lambda}(1520)(\rightarrow K^+\bar{p})p)/\mathcal{B}(B^+ \rightarrow J/\psi(\rightarrow p\bar{p})\pi^+)$		$0.033 \pm 0.005 \pm 0.007$ [3]	$0.033 \pm 0.009$
	$\mathcal{B}(B^0 \rightarrow p\bar{p}K^+K^-)/\mathcal{B}(B^0 \rightarrow p\bar{p}K^+\pi^-)$		$0.019 \pm 0.005 \pm 0.002$ [16]	$0.019 \pm 0.005$
	$\mathcal{B}(B^0 \rightarrow p\bar{p}\pi^+\pi^-)/\mathcal{B}(B^0 \rightarrow p\bar{p}K^+\pi^-)$		$0.46 \pm 0.02 \pm 0.02$ [16]	$0.46 \pm 0.03$

Channels with no RPP# were not included in PDG Live as of Dec. 31, 2017.

† Includes contribution where  $p\bar{p}$  is produced in charmonia decays.

†† Original experimental relative BF multiplied by the best values (PDG2014) of certain reference BF's. The first error is experimental, and the second is from the reference BF's.

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