

Heavy Flavor Averaging Group  
15 July 2005

Compilation of  $B_s$  Rare Branching Fractions  
All branching fractions are in units of  $10^{-6}$

In PDG2004      **New since PDG2004 (preliminary)**      **New since PDG2004 (published)**

RPP#	Mode	PDG2004 Avg.	CDF	D0	New Avg.
15	$\phi\phi$	< 1183	$14_{-5}^{+6} \pm 6$ †		$14_{-7}^{+8}$
24	$\mu^+\mu^-$	< 2.0	< 0.16	< 0.30	< 0.16
26	$e^\pm\mu^\mp$	< 6.1	< 6.1		< 6.1
27	$\mu^+\mu^-\phi$	< 47	< 47	< 3.2 †	< 3.2 †

†Relative BF converted to absolute BF

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15 July 2005

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

In PDG2004    New since PDG2004 (preliminary)    New since PDG2004 (published)

RPP#	Mode	PDG2004 Avg.	CDF	D0	New Avg.
9	$\mathcal{B}(B_s^0 \rightarrow \pi^+\pi^-)/\mathcal{B}(B_s^0 \rightarrow K^+K^-)$		$< 0.10$		$< 0.10$
15	$\mathcal{B}(B_s^0 \rightarrow \phi\phi)/\mathcal{B}(B_s^0 \rightarrow J/\psi\phi)$		$(10_{-4}^{+5} \pm 1) \times 10^{-3}$		$10_{-6}^{+7}$
16	$f_s\mathcal{B}(B_s^0 \rightarrow K^+\pi^-)/f_d\mathcal{B}(B_d^0 \rightarrow K^+\pi^-)$		$< 0.11$		$< 0.11$
17	$f_s\mathcal{B}(B_s^0 \rightarrow K^+K^-)/f_d\mathcal{B}(B_d^0 \rightarrow K^+\pi^-)$		$0.50 \pm 0.08 \pm 0.07$		$0.50 \pm 0.11$
27	$\mathcal{B}(B_s^0 \rightarrow \mu^+\mu^-\phi)/\mathcal{B}(B_s^0 \rightarrow J/\psi\phi)$			$< 3.5 \times 10^{-3}$	$< 3.5 \times 10^{-3}$

# Tevatron References

- [1] S. Farrington for the CDF Collaboration, Beauty 2005.
- [2] S. Dugad for the D0 Collaboration, HCP 2005.
- [3] CDF Collaboration (F. Abe *et al.*), Phys. Rev. Lett. **81**, 5742 (1998).
- [4] CDF Collaboration (D. Acosta *et al.*), Phys. Rev. D **65**, 111101 (2002).
- [5] CDF Collaboration (D. Acosta *et al.*), hep-ex/0502044, 2005.