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Probing New Physics with B^0_s -> mu+ mu-

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The rare decay $B_s \to \mu^+\mu^-$ plays a key role for the testing of the Standard Model. It is discussed that the sizable decay width difference $\Delta\Gamma_s$ of the B_s-meson system affects this channel. As a consequence, its calculated Standard Model branching ratio has to be upscaled by about 10% to $(3.56 \pm 0.18) \times 10^{-9}$. This prediction is the reference value for the comparison with the time-integrated experimental branching ratio, where LHCb has recently reported $(3.2^{+1.5}_{-1.2}) \times 10^{-9}$ corresponding to the first evidence for $B_s \to \mu^+\mu^-$. The sizable $\Delta\Gamma_s$ makes a new observable through the effective $B_s \to \mu^+\mu^-$ lifetime accessible, which probes New Physics in a way complementary to the branching ratio and adds an exciting new topic to the agenda for the high-luminosity upgrade of the LHC.
Further probes of New Physics are offered by a CP-violating rate asymmetry. Correlations between these observables and the
$B_s \to \mu^+\mu^-$ branching ratio are illustrated for specific models of New Physics.

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