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Lepton Flavor Universality in $\Upsilon(3S)$ Decays to Tau Leptons and Muons with the BaBar Experiment

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Lepton flavor universality in vector interactions is a robust prediction of the Standard Model, and deviations from universality would necessitate new physics. The recent hints of lepton flavor non-universality in B meson decays highlight the importance of complementary probes of lepton flavor universality, including in decays of Υ mesons. We report on a recent precision measurement of the ratio of branching fractions $\text{BF}(\Upsilon(3S) \rightarrow \tau^+\tau^-) / \text{BF}(\Upsilon(3S) \rightarrow \mu^+\mu^-)$ using a sample of 122 million $\Upsilon(3S)$ mesons collected with the BaBar detector. The uncertainties in this measurement improve on earlier studies by almost an order of magnitude, and are of comparable order to the deviations predicted in certain models of lepton non-universality in B meson decays.

Summary

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