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Lepton Flavour Universality and the Lepton Flavour Violation in $\Upsilon(3S)$ decays at BABAR

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The *BABAR* detector collected a sample of 122 million $\Upsilon(3S)$ mesons, corresponding to an integrated luminosity of 28 fb^{-1} , operating the PEP-II e^+e^- collider at a center-of-mass energy of about 10.355 GeV. This sample is the largest ever collected at that energy and provides unique opportunities to test several aspects of the Standard Model. We report on a precision measurement of the ratio $R_{\tau\mu} = BF(\Upsilon(3S) \rightarrow \tau\tau^-)/BF(\Upsilon(3S) \rightarrow \mu^+\mu^-)$. The result is in agreement with the Standard Model prediction and its uncertainty is almost an order of magnitude smaller than the only previous measurement reported by the CLEO collaboration. We also present a search for the Lepton Flavour Violating decays $\Upsilon(3S) \rightarrow e^\pm\mu^\mp$, unobservable in the SM, but predicted to be enhanced in several new physics extensions.

Summary

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