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$\tau - \mu$ lepton flavor universality in $\Upsilon(3S)$ decays at the $BABAR$ experiment

We report on a precision measurement of the ratio $R_{\tau\mu} = BF(\Upsilon(3S) \to \tau^+\tau^-)/BF(\Upsilon(3S) \to \mu^+\mu^-)$ using data collected with the BABAR detector at the SLAC PEP-II e^+e^- collider. The measurement is based on a 28 fb^-1 data sample collected at a center-of-mass energy of 10.355 GeV/c^2 which corresponds to a sample 122 million $\Upsilon(3S)$ mesons. In order to estimate backgrounds from direct dilepton production we use 2.6 fb^-1 of data collected 30 MeV below the $\Upsilon(3S)$ resonance mass and 86 fb^-1 of data collected near the $\Upsilon(4S)$ resonance. The ratio is measured to $R_{\tau\mu} = 0.9662 \pm 0.0084 \pm 0.0135$ and is in agreement with the Standard Model prediction. Its uncertainty is almost order of magnitude smaller than the only previous measurement reported by the CLEO collaboration.

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