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## Measurements of $|V_{us}|$ and Second Class Currents and Searches for Violation of Lepton Universality and CPT in Tau Decays at BABAR

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We report on a variety of results involving decays of the tau lepton using the very large sample of tau+tau- pairs produced in e+e- annihilation data collected with the BaBar detector at the PEP-II asymmetric-energy B Factory near a center-of-mass energy of 10.58 GeV. From measurements of the ratios of branching fractions:  $B(\tau \rightarrow \mu \nu_{\mu}) / B(\tau \rightarrow e \nu_e)$ ,  $B(\tau \rightarrow \pi \nu) / B(\tau \rightarrow e \nu_e)$ , and  $B(\tau \rightarrow K \nu) / B(\tau \rightarrow e \nu_e)$  we test with high precision the Standard Model assumption of mu-e and tau-mu charged current lepton universality and provide a determination of the Cabibbo-Kobayashi-Maskawa matrix element  $|V_{us}|$ . Furthermore, we report on preliminary measurements of  $\tau^- \rightarrow K^- n \pi^0 \nu_{\tau}$  with  $n = 0, 1, 2, 3$  and  $\tau^- \rightarrow \pi^- n \pi^0 \nu_{\tau}$  with  $n = 3, 4$  as well as on the measurements of the branching fractions and hadronic mass distributions of  $\tau^- \rightarrow K_S^0 \pi^- \nu_{\tau}$ ,  $\tau^- \rightarrow K_S^0 \pi^- \pi^0 \nu_{\tau}$ ,  $\tau^- \rightarrow K_S^0 \pi^- K^0_L \nu_{\tau}$ . Data from the inclusive strange tau decay results are used in a different determination of  $|V_{us}|$ . We also report on our search for second class currents in  $\tau^- \rightarrow \pi^- \eta \nu_{\tau}$ , where the eta decays into  $\pi^+ \pi^- \pi^0$  and our measurement of the tau mass. We obtain a test of CPT by measuring the difference between the masses of the tau+ and tau-.

**Primary author:** BABAR, Collaboration (SLAC)**Presenter:** LUSIANI, Alberto (Dipartimento di Fisica)**Session Classification:** 06 - CP violation, CKM and Rare Decays**Track Classification:** 06 - CP violation, CKM and Rare Decays