

Selected electroweak results using tau leptons at BaBar

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A selection of electroweak measurements performed by the BaBar experiment operating at the Stanford Linear Accelerator Center is presented.

Using a sample of 122 million $Y(3S)$ decays, we measure the ratio

$R = \text{BR}(Y(1S) \rightarrow \tau\tau) / \text{BR}(Y(1S) \rightarrow \mu\mu)$; the

measurement is intended as a test of the lepton universality and as a search for a light pseudoscalar Higgs boson in NMSSM

scenarios. Such a boson could appear in a deviation of the ratio

R from 1. The analysis exploits the decays $Y(3S) \rightarrow Y(1S)\pi^+\pi^-$,

$Y(1S) \rightarrow l^+l^-$, where $l = \mu, \tau$.

We also present a search for the non-conservation of lepton flavor in the

decay $\tau \rightarrow \mu/e \gamma$ performed with 967 M tau decays from e^+e^-

annihilations at a center-of-mass energy corresponding to $Y(2S)$, $Y(3S)$ and

$Y(4S)$ resonances.

Two additional results are based only on data recorded by BaBar at the $Y(4S)$ resonance.

The first result is a precision measurement of the mass of the

tau lepton using 423 fb⁻¹ of data. Using a pseudomass endpoint method, we determine

the tau mass and we also measure the mass difference between the tau⁺

and tau⁻. Finally, precise measurements of the tau⁻ $\rightarrow K_S^0 \pi^- (\pi^0) \nu_\tau$ branching

fraction and hadronic mass distribution are made using ~ 384 fb⁻¹ of

data. The mass and width of $K^*(892)^-$ meson

are found to be significantly different from PDG averages from

those found in hadroproduction but are consistent with the recent

measurements made by Belle using the same tau decay mode as

considered here.

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