

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 τ 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

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

the τ mass and we also measure the mass difference between the τ^+

and τ^- . 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 τ decay mode as

considered here.

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