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Precision τ measurements from Belle and lepton-flavor-violating τ decay prospects at SuperKEKB/Belle II (10' + 5')

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In this talk, we present studies of τ leptons at Belle and the prospects at SuperKEKB/Belle II.

We evaluate the Michel parameters of τ leptonic decay using Belle's full data sample. This measurement is important to reveal the Lorentz structure of τ leptonic decay, which includes not only the $V-A$ interaction but also contributions from scalar, tensor and others that may arise from New Physics; this measurement tests lepton universality as well. We also measure branching fractions of τ decays into three charged pseudo-scalars and a tau neutrino using the full sample of Belle. In the previous analysis by Belle, some deviation from the existing measurements was seen for the branching fraction on $\tau \to \pi\pi\pi\nu$ mode; we expect to make this clear by our full analysis.

The Belle˜II experiment aims to record 50 ab^{-1} of data at the SuperKEKB energy-asymmetric e^+e^- collider. The anticipated high statistics data sample has excellent sensitivity to lepton flavor violating (LFV) τ lepton decays including $\tau \to \mu\gamma$, $\tau \to \mu\pi^0/\eta$ and so on. Prospects and sensitivities for τ LFV at Belle˜II will be presented.

Primary author: INAMI, Kenji (Nagoya university)

Presenter: INAMI, Kenji (Nagoya university)

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