

# Tau physics prospects at Belle II

## Content

The Belle II experiment is a substantial upgrade of the Belle detector and will operate at the SuperKEKB energy-asymmetric  $e^+e^-$  collider. The design luminosity of the machine is  $8 \times 10^{35} \text{ cm}^{-2}\text{s}^{-1}$  and the Belle II experiment aims to record  $50 \text{ ab}^{-1}$  of data, a factor of 50 more than its predecessor. From February to July 2018, the machine has completed a commissioning run and main operation of SuperKEKB has started in March 2019. Belle II has a broad  $\tau$  physics program, in particular in searches for lepton flavour and lepton number violations (LFV and LNV), benefiting from the large cross section of the pair wise  $\tau$  lepton production in  $e^+e^-$  collisions. We expect that after 5 years of data taking, Belle II will be able to reduce the upper limits on LF and LN violating  $\tau$  decays by an order of magnitude. Any experimental observation of LFV or LNV in  $\tau$  decays constitutes an unambiguous sign of physics beyond the Standard Model, offering the opportunity to probe the underlying New Physics. We also present a first measurement of the tau mass and the prospects for the tau lifetime measurement. In this talk we will review the  $\tau$  lepton physics program of Belle II.

## Summary

**Primary author(s)** : Prof. LIBBY, Jim (Indiana Univ.); Dr. KRAETZSCHMAR, Thomas (Max Planck Munich)

**Presenter(s)** : Dr. KRAETZSCHMAR, Thomas (Max Planck Munich)