

Early physics prospects for radiative and electroweak penguin decays at Belle II

Tuesday, May 7, 2019 5:45 PM (15 minutes)

The Belle II experiment at the SuperKEKB energy-asymmetric e^+e^- collider is a substantial upgrade of the B factory facility at the Japanese KEK laboratory. 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 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 the main operation of SuperKEKB has started in March 2019. Recent measurements of B decays proceeding through a flavor changing neutral current transition such as $b \rightarrow s$ transitions have shown deviations from the Standard Model (SM) prediction. These decays are forbidden at tree-level in the SM and can only occur via suppressed loop level diagrams. Rare decays of B mesons are thus an ideal probe for phenomena beyond the SM, since contributions from new particles can affect the decays at the same level as SM particles. In this presentation we will review the prospects for these decays at Belle II: Early physics goals of the Belle II physics program are to rediscover these rare decays. Especially radiative $b \rightarrow s\gamma$ decays can be measured on a small dataset and in the near future Belle II can provide independent tests of anomalies in $b \rightarrow s\ell\ell$ decays. Ultimately, the clean Belle II environment will allow to study modes with large missing energy such as $B \rightarrow K^*\nu\bar{\nu}$.

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Session Classification: Parallel session 1

Track Classification: Rare Decays of Hadrons and Leptons