Contribution ID: **305** Type: **not specified**

Belle II studies of missing energy decays and searches for dark photon production

Wednesday, April 13, 2016 6:02 PM (20 minutes)

The Belle II experiment at the SuperKEKB collider is a major upgrade of the KEK "B factory" facility in Tsukuba, Japan. The machine is designed for an instantaneous luminosity of 8×10^{35}~cm^{-2}\,s^{-1}, and the experiment is expected to accumulate a data sample of about 50 ab^{-1} well within the next decade. With this amount of data, decays sensitive to physics beyond the Standard Model can be studied with unprecedented precision. One promising set of modes are physics processes with missing energy such as $B^+ \to \tau^+\nu$, $B \to D^{(*)}\tau\nu$, and $B \to K^{(*)}\nu\bar{\nu}$ decays. The Belle II data also allows searches for candidates for the dark photon, the gauge mediator of a hypothetical dark sector, which has received much attention in the context of dark matter models.

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Session Classification: WG7 Future Experiments

Track Classification: Future Experiments