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$R(D^{(\ast)})$ measurement at the Belle II Detector

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The Belle II detector is a significant upgrade of the Belle detector and will be a competitive, perhaps unique, environment in which to study rare B decays with missing energy to a sensitivity that would exhibit indirect New Physics effects. From a $B \cdot \overline{B}$ meson pair that has been produced in the SuperKEKB energy-asysmmetric e^+e^- collider and B-factory, one B meson can be fully reconstructed through powerful B-tagging, which in turn provides strong constraints for the other B meson. The design luminosity of SuperKEKB is $8 \times 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$, where the Belle II experiment aims to record 50 ab^{-1} of data, a factor of 50 more than the original Belle experiment. This is an ideal environment in which rare decays with missing energy can be measured. The decay $B \to D^{(*)} \tau \nu$ will be examined with the prospects of the $R(D^{(*)})$ measurements, in which we anticipate a result of unprecedented precision with as little as 5 ab^{-1} of data.

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