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Physics Benchmarks for the Belle II Pixel Detector

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SuperKEKB, the massive upgrade of the asymmetric electron positron collider KEKB in Tsukuba, Japan, aims at an integrated luminosity in excess of 50 ab^{-1} . It will deliver an instantaneous luminosity of $8 \cdot 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$, which is 40 times higher than the world record set by KEKB.

At this high luminosity, a large increase of the background relative to the previous KEKB machine is expected. This and the more demanding physics rate ask for an entirely new tracking system. The expected increase of background would in fact create an unacceptable high occupancy for a silicon strip detector, making an efficient tracks reconstruction and vertexing impossible. The solution for Belle II is a pixel detector which intrinsically provides three dimensional space points.

The new two layers silicon pixel vertex detector, based on the DEPFET technology, will be mounted directly on the beam pipe. It will provide an accurate measurement of the tracks position in order to precisely reconstruct the decay vertex of the short living particles.

In this talk we will discuss the physics performance of the Belle II pixel vertex detector which will be essential for the precise measurement of the CP parameters in various B and D decay channels.

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