

BELLE-2 Pixel detector upgrade

The DEPFET technology is the baseline for the innermost detector of the Belle II experiment at the e+e- SuperKEKB collider at KEK. This technology integrates signal detection and a first phase of signal amplification in a single silicon structure with a 75 μm thin pixel array. This feature provides a very accurate position measurement, with an overall material budget of 0.2% radiation length and reduces the impact of multiple scattering for tracks with low transversal momentum. Furthermore, the physics goals of the experiment impose challenging requirements to this technology, but DEPFET with its excellent signal-noise-ratio, its lower power consumption and its non destructive readout has proven to be a suitable solution for the Belle II PXD necessities. The vertex pixel detector will consist of two DEPFET layers at radii of 14 mm and 22 mm with 8 and 12 modules respectively. The pixel sizes will vary, between 50x50 –55 μm^2 at the first layer and between 50x70 –85 μm^2 at the second layer, to optimize the charge sharing efficiency. Moreover the four-fold readout in rolling shutter mode provides a readout speed of 20 $\mu\text{s}/\text{frame}$. All of these features, the sensor concept and the electronics involved will be presented in detail.

Primary author: Mr BORONAT, Marçà (IFIC - CSIC)

Presenter: Mr BORONAT, Marçà (IFIC - CSIC)