

# Measurement of the hit resolution and reconstruction efficiency of the Belle-II Silicon Vertex Detector in the 2016 beam test at DESY

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The Belle-II experiment is a multipurpose particle detector which will take data at the asymmetric electron positron collider SuperKEKB operated at a design luminosity of  $8 \times 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$ . Track reconstruction close to the interaction point in the Belle-II experiment is provided by the Silicon Vertex Detector (SVD), consisting of 4 layers of double sided silicon strip detectors, and two layers of pixel detectors (PXD). The SVD was designed to provide a high hit finding efficiency and position resolution when operated in the high-luminosity environment provided by the SuperKEKB collider.

In April 2016 a combined beam test of the SVD and the PXD has been performed at DESY Hamburg to test the full data acquisition chain which will be used in the Belle-II experiment.

For this beam test a section of the SVD and the PXD have been placed in a beam of high energy electrons. Several runs of data taking have been recorded with varying beam energies, ranging from 2 GeV up to 5 GeV, within a magnetic field which strength was varied between 0 Tesla and 1 Tesla.

We use the data recorded at the beam test at DESY to perform a measurement of the hit reconstruction efficiency and the resolution of the reconstruction of hit positions of the SVD-sensors. For this measurement we use reconstructed tracks to predict the position of a hit on the SVD-sensor under test and try to find reconstructed hits in the proximity of the predicted position. Efficiencies are estimated by counting how often a hit could be associated to the reconstructed track. The spatial resolution of reconstructed hits is estimated by analyzing the residuals of the reconstructed hit positions with respect to the positions predicted by the extrapolated track.

To avoid biases the SVD-sensor under test is not included in the track finding and fitting procedure. The efficiency is measured as a function of the position on the sensor.

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