



Contribution ID: 104

Type: Talk

Operational experience and performance of the Silicon Vertex Detector after the first long shutdown of Belle II

Thursday, February 20, 2025 2:25 PM (20 minutes)

In 2024 the Belle II experiment resumed data taking after the Long Shutdown 1, required to install a two-layer pixel detector and upgrade components of the accelerator.

We describe the challenges of this upgrade, reporting on the operational experience.

With new data, SVD confirmed the high hit efficiency, the large signal-to-noise and the good cluster position resolution.

Over the next years, the SuperKEKB instantaneous luminosity is expected to increase to target luminosity, resulting in a larger SVD occupancy caused by beam-background. Considerable efforts have been made to improve SVD reconstruction software by exploiting the excellent SVD hit-time resolution to determine the collision time (event-T0) and reject off-time particle hits. A novel procedure to group SVD hits event-by-event, based on their time, has been developed by using the grouping information during reconstruction, significantly reducing the fake rate while preserving the tracking efficiency.

The front-end chip (APV25) is operated in “multi-peak” mode, reading six samples. A 3/6-mixed acquisition mode, based on the timing precision of the trigger, has been successfully tested in physics runs to reduce background occupancy, trigger dead-time and data size.

Studies on the radiation damage have shown that, although the sensor current and the strip noise have shown a moderate increase due to radiation, the performance will not be seriously degraded during the lifespan of the detector.

Primary experiment

Belle II SVD collaboration

Author: Dr RAVINDRAN, Krishnakumar

Presenter: Dr RAVINDRAN, Krishnakumar

Session Classification: Systems

Track Classification: Systems