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Performance Studies of the Belle II Silicon Vertex Detector

Title: Performance Studies of the Belle II Silicon Vertex Detector

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The Belle II experiment at the SuperKEKB asymmetric-energy e+e- collider in KEK, Japan will operate at an instantaneous luminosity of 8×10ˆ35 cmˆ-2sˆ-1, which is about 40 times larger than that of its predecessor, Belle. It is built with the aim of collecting a huge amount of data corresponding to an integration luminosity of about 50 abˆ-1 by 2025 for precise CP violation measurements and searches for new physics. At this high luminosity, Belle II will face harsh backgrounds. To validate the performance of the silicon vertex detector (SVD) –a key component of Belle II –at such high rate and harsh background environment, a detailed systematic performance study is essential using offline software reconstruction. In this work, correlation studies of occupancy, cluster charge and position, and signal-to-noise ratio for different cluster sizes for each SVD sensors/side are presented. These studies will help us to understand and optimize the operation parameters of SVD.

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