

The Belle II SVD Data Readout System

The Belle II Experiment at the High Energy Accelerator Research Organization (KEK) in Tsukuba, Japan, will explore the asymmetry between matter and antimatter and search for new physics beyond the standard model.

172 double-sided silicon microstrip sensors are arranged cylindrically in four layers around the Belle-II collision point to be part of a system, called the silicon vertex detector (SVD), which would measure the tracks of the collision products of electrons and positrons. A total of 1748 radiation-hard APV25 chips read out 128 silicon strips each and send the analog signals by time-division multiplexing out of the radiation zone to 48 Flash Analog Digital Converter Modules.

Each of them applies processings to the data; for example, it uses a digital finite impulse response filter to compensate line signal distortions, and extracts the peak timing and amplitude from a set of data points for each hit, using a neural network.

We present an overview of the SVD data readout system, along with aspects like sensor material budget, sensor mechanics, the CO₂ cooling system, radiation hardness, front-end electronics, cabling, power supplies, data processing, and electromagnetic compatibility characteristics.

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