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Status and Result of the Belle II Particle Identification Systems

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The Belle II Time-Of-Propagation (TOP) counter is a novel particle identification detector based on the combined measurement of a particle's time of flight, the propagation time of Cherenkov photons it emits when crossing a thin fused silica bar, and their geometrical pattern. The Cherenkov radiation is internally reflected to an array of micro-channel-plate photomultipliers located at one end of the bars. The photomultiplier signal is digitized by zero-deadtime waveform sampling ASIC with time resolution of 20 ps. The waveform features like timing, amplitude and integral are extracted online using a Xilinx FPGA-ARM device. The single photo-electron time resolution of the readout chain is better than 100 ps. Similar devices have been proposed, but TOP is the only operational detector of this kind at the moment.

We will describe the status of the detector hardware in its fourth year of operations, the stability and quality of the time calibration, the particle identification performance and we will present an outlook for possible upgrades.

Collaboration

Belle II

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Session Classification: Photo Detectors and Particle ID