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Particle Identification with the Belle II iTOP Detector

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The Imaging Time-of-Propagation (iTOP) Cherenkov ring-imaging detector is a particle identification system designed for use in the barrel region of the Belle II spectrometer. The system detects Cherenkov photons produced by charged particles passing through one of 16 quartz bars arranged in a barrel around the inner tracking detectors. An array of 32 pixelated micro-channel plate photomultipliers (MCP-PMTs) instrument each bar to detect internally reflected photons with time resolution better than 50ps. A waveform sampling ASIC-based frontend readout electronics system digitizes and measures photon detection times. Photon time information is combined with tracker data to reconstruct the charged particle's Cherenkov ring image for use in particle identification analysis. The ability to distinguish between kaons and pions with high sensitivity will be crucial in many Belle II physics measurements. This presentation will describe the iTOP detector design and application in physics analyses, and summarize current detector development activities and plans leading up to installation in early 2015.

Summary

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