

# Operation of the Belle II imaging Time-Of-Propagation (iTOP) detector before and after the first long shutdown

*Monday, 27 May 2024 16:50 (20 minutes)*

The iTOP detector is a Cherenkov detector specialized on particle identification at Belle II. The SuperKEKB accelerator collides electrons and positrons with a design luminosity of  $6 \cdot 10^{35} / (\text{cm}^2 \text{ s})$ . In order to exploit the high collision rate Belle II has a trigger rate of up to 30 kHz.

The iTOP detector uses quartz bars as the source of Cherenkov photons. The photons are reflected inside the bars until they hit photomultipliers installed at one end. The spatial distribution and precise arrival times of the detected photons are used to reconstruct the Cherenkov angle and particle flight time. To achieve a good pion-kaon separation the photon arrival times have to be measured with a resolution of 100 ps. Microchannel plate photomultipliers together with dedicated high-speed electronics for 2.7 GSa/s waveform sampling in 8192 channels are used to achieve this requirement.

After four years of operation, the experiment entered its first long shutdown phase in 2022. Aging components of iTOP were exchanged and the detector was prepared for data-taking at increasing luminosities and backgrounds after the long shutdown. In this talk the design of the iTOP detector will be shown and experience and results from operation will be discussed together with an outlook on future running conditions.

## Collaboration

Belle II

## Role of Submitter

I am the presenter

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