

Belle II aerogel RICH detector

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Aerogel Ring Imaging Cherenkov counter (ARICH) - is the particle identification device installed in the forward region of the Belle II detector at SuperKEKB accelerator facility in Japan. The first electron – positron collisions at SuperKEKB took place 26 of April in 2018 during so called phase 2 run. Measured performance of the ARICH detector based on recorded bhabha events during phase 2 are presented.

To focus Cherenkov light ARICH use two 20 mm thick layers of silica aerogel radiator with 1.045 and 1.055 refractive index for upstream and downstream layer respectively. The photon detector plane consist of 420 Hybrid Avalanche Photo Detectors (HAPD) which conceived to operate in 1.5 T magnetic field. Each HAPD has 144 channels with size of 4.9 mm x 4.9 mm. ARICH is located two meters far from the interaction point. Its main goal is to separate kaons from pions in 0.5 - 4.0 GeV/c momentum range.

The particle identification algorithm based on ratios of log likelihood which takes into account Cherenkov angle and number of Cherenkov and background photons for given particle hypothesis. We measure 16 mrad angular resolution per photon and 10 photons per bhabha electron within 6 – 8 GeV/c momentum range which is in agreement with simulation within 10 % while measured number of background photons per track is 1.3 which is 30 % more than seen from simulation.

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