



Contribution ID: 416

Type: Oral

## Particle identification algorithms for the Panda Barrel DIRC

*Monday 4 November 2019 12:15 (15 minutes)*

The innovative Barrel DIRC (Detection of Internally Reflected Cherenkov light) counter will provide hadronic particle identification (PID) in the central region of the PANDA experiment at the new Facility for Antiproton and Ion Research (FAIR), Darmstadt, Germany. This detector is designed to separate charged pions and kaons with at least 3 standard deviations for momenta up to 3.5 GeV/c covering the polar angle range of 22-140 degree.

An array of microchannel plate photomultiplier tubes is used to detect the location and arrival time of the Cherenkov photons with a position resolution of 2 mm and time precision of about 100 ps. Two reconstruction algorithms have been developed to make optimum use of the observables and to determine the performance of the detector. The “geometrical reconstruction” performs PID by reconstructing the value of the Cherenkov angle and using it in a track-by-track maximum likelihood fit. This method mostly relies on the position of the detected photons in the reconstruction, while the “time imaging” utilizes both, position and time information, and directly performs the maximum likelihood fit using probability density functions determined analytically or from detailed simulations.

Geant4 simulations and data from the particle beams were used to optimize both algorithms in terms of PID performance and reconstruction speed. We will present current status of development and discuss advantages of each algorithm.

### Consider for promotion

No

**Authors:** Dr DZHYGADLO, Roman (GSI - Helmholtzzentrum für Schwerionenforschung GmbH (DE)); PANDA CHERENKOV GROUP

**Presenter:** Dr DZHYGADLO, Roman (GSI - Helmholtzzentrum für Schwerionenforschung GmbH (DE))

**Session Classification:** Track 2 –Offline Computing

**Track Classification:** Track 2 –Offline Computing