

Barrel time-of-flight detector for the PANDA experiment at FAIR

Tuesday, 23 May 2017 17:42 (18 minutes)

The PANDA experiment at the new FAIR facility at GSI will perform high precision experiments in the strange and charm quark sector using cooled beams of antiprotons at high luminosity, in the momentum range of 1.5 GeV/c to 15 GeV/c. For the identification of low momentum charged particles with extreme accuracy, the barrel time-of-flight (TOF) detector is one of the key components of PANDA. Its main requirement is to achieve a time resolution of $\sigma < 100$ ps as well as a large solid angle coverage at high collision rates.

The final Barrel ToF consists of 16 independent segments, located azimuthally at 50 cm radial distance from the beam pipe. Every segment contains a sensitive area, that is covered by 2x60 single Scintillator Tile (SciTil). Each SciTil (90 x 30 x 5 mm³) is read out by 4 Silicon Photomultipliers (SiPM) on both ends.

In 2016, a beam test at CERN exposed the SciTil with 6 GeV/c secondary beam where $\sigma < 60$ ps time resolution was reached. In this talk we will present the further optimization of operational conditions and time resolution.

Primary authors: LEHMANN, Albert (Friedrich Alexander Universität Erlangen-Nürnberg, Erlangen, Germany); SCHWARZ, Carsten (GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany); STEIN-SCHADEN, Dominik (Österreichische Akademie der Wissenschaften, Stefan Meyer Institut für Subatomare Physik, Wien, Austria); ORTH, Herbert (GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany); BRINKMANN, Kai (Justus Liebig-Universität Gießen II. Physikalisches Institut, Gießen, Germany); DUTTA, Kamal (Gauhati University, Physics Department, Guwahati, India); SUZUKI, Ken (Österreichische Akademie der Wissenschaften, Stefan Meyer Institut für Subatomare Physik, Wien, Austria); GÖTZEN, Klaus (GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany); KALITA, Kushal (Gauhati University, Physics Department, Guwahati, India); SCHMITT, Lars (FAIR, Facility for Antiproton and Ion Research in Europe, Darmstadt, Germany); GRUBER, Lukas (European Organiz. for Nuclear Res. (CERN), Geneva, Switzerland); CHIRITA MIHAILA, Marius (Österreichische Akademie der Wissenschaften, Stefan Meyer Institut für Subatomare Physik, Wien, Austria); BÖHM, Merlin (Friedrich Alexander Universität Erlangen-Nürnberg, Erlangen, Germany); KRATOCHWIL, Nicolaus (Österreichische Akademie der Wissenschaften, Stefan Meyer Institut für Subatomare Physik, Wien, Austria); ZIMMERMANN, Sebastian (Justus Liebig-Universität Gießen II. Physikalisches Institut, Gießen, Germany / Österreichische Akademie der Wissenschaften, Stefan Meyer Institut für Subatomare Physik, Wien, Austria)

Presenter: KRATOCHWIL, Nicolaus (Österreichische Akademie der Wissenschaften, Stefan Meyer Institut für Subatomare Physik, Wien, Austria)

Session Classification: R1-Particle identification(1)

Track Classification: Particle identification