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High Voltage Monolithic Active Pixel Sensors for the PANDA Luminosity Detector

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The PANDA-Experiment will be part of the new FAIR facility at Darmstadt, Germany. It is a fixed target experiment in the antiproton storage ring HESR providing beams with excellent resolution $\Delta p/p \approx 10^{-5}$. The scientific scope of PANDA consists of several pillars like: hadron spectroscopy, properties of hadrons in matter, nucleon structure and hypernuclei. In particular with PANDA it will be possible to study QCD bound states consisting of charm quarks and measure their shapes in energy scan measurements with precision better than 50 keV. For the normalization of the single scan points the precise determination of the luminosity is needed.

The luminosity detector will determine the luminosity by measuring the angular distribution of elastically scattered antiprotons very close to the beam axis (3-8 mrad). To reconstruct the antiproton tracks very precisely four layers of 50 μm silicon sensors with smart pixel readout on chip (HV-MAPS) will be placed inside vacuum around the beam pipe. Those sensors are currently under development by the Mu3e-collaboration. This presentation will discuss the status of the HV-MAPS and the electronic read-out chain.

Collaboration

PANDA Luminosity Detector Group

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