Contribution ID: **16** Type: **Oral**

The silicon Micro Vertex Detector of the PANDA experiment

Monday, 21 May 2012 17:55 (20 minutes)

The PANDA experiment will make use of cooled antiproton beams of unprecedented quality, that will become available at the Facility for Antiproton and Ion Research (FAIR) in Darmstadt, featuring up to 2×10^{11} antiprotons and momentum between 1.5 –15 GeV/c.
The physics program includes measurements of hyperons produced at low energies, spectroscopy of the charmonium and open-charm mesons. To handle the forward particle distribution due to the Lorentz boost, the apparatus is arranged in an asymmetric layout around the interaction point between antiprotons and pellet or gas jet target.
This peculiarity requires a tracking detector with a forward design and in particular an innermost Micro Vertex Detector based on silicon devices with an unusual geometry. The material budget of this silicon tracker has to be minimized in view of particle momenta ranging from few hundreds of MeV/c up to several GeV/c. Besides, the high interaction rate asks for fast data readout as PANDA is without low-level trigger selection and particle identification is planned over the full range of energies.
The status of the MVD will be presented.

Optional extended abstract

The PANDA experiment will make use of cooled antiproton beams of unprecedented quality, that will become available at the Facility for Antiproton and Ion Research (FAIR) in Darmstadt, featuring up to 2•10^11 antiprotons and momentum between 1.5 –15 GeV/c.
The physics program includes measurements of hyperons produced at low energies, spectroscopy of the charmonium and open-charm mesons. To handle the forward particle distribution due to the Lorentz boost, the apparatus is arranged in an asymmetric layout around the interaction point between antiprotons and pellet or gas jet target.
This peculiarity requires a tracking detector with a forward design and in particular an innermost Micro Vertex Detector based on silicon devices with an unusual geometry. The material budget of this silicon tracker has to be minimized in view of particle momenta ranging from few hundreds of MeV/c up to several GeV/c. Besides, the high interaction rate asks for fast data readout as PANDA is without low-level trigger selection and particle identification is planned over the full range of energies.
To cope with these requirements the MVD includes innermost layers made of thinned epitaxial silicon hybrid pixel detectors and outer layers composed of double sided silicon micro strips. Since the MVD volume is compact, the cooling system and the routing, planned only in the upstream direction, are crucial issues. To meet the first one, carbon foams are used to increase the heat dissipation towards the cooling pipes and to cope with the second one, aluminium cables and busses are under study. New non-triggered readout chips developed in 130 nm CMOS technology feature high speed serial readout and charge measurement with Time over Threshold.

for the collaboration

PANDA

Primary author: Dr CALVO, Daniela (INFN - Torino)

Presenter: Dr CALVO, Daniela (INFN - Torino)

Session Classification: New Detector Systems and Upgrades

Track Classification: S1 - New Detector Systems and Upgrades