20th International Conference on Computing in High Energy and Nuclear Physics (CHEP2013)

Contribution ID: **456** Type: **Poster presentation**

Simulation of the PANDA Lambda disks

Monday, October 14, 2013 3:00 PM (45 minutes)

Ajay Kumar and Ankhi Roy
For the PANDA collaboration
Indian Institute of Technology Indore, Indore-4520017, India
Email- ajayk@iiti.ac.in

The PANDA experiment is one of the main experiments at the future accelerator facility FAIR which is currently under construction in Darmstadt, Germany. Experiments will be performed with intense, phase space cooled antiproton beams incident on a hydrogen or heavy nuclear target. The main physics motivation of PANDA is to explore the non-perturbative regime of QCD and to study hadronic states. In this context, here is a possibility to include hyperon studies in the PANDA physics program. Hyperons travel a large distance before they decay into other particles. In order to increase the acceptance to measure these particles, there is a concept to include an additional so-called "Lambda Disk" detector.
The Micro Vertex Detector (MVD) is the innermost tracking detector of PANDA. It consists of four barrel layers and six forward disk layers. It is made up of two types of silicon sensors – silicon hybrid pixels and double sided silicon strips. The last layer of the MVD forward disk is situated at 23 cm downstream of the interaction point and the first layer of GEM tracking station is located 110 cm downstream from the interaction point. Hence, there is a large region without tracking information. Therefore, it is proposed to place two additional disks known as the Lambda disks in this region. One layer is at 40 cm and the other is at 60 cm downstream from the interaction point. The detector will enhance the reconstruction probability for hyperons. As a starting geometry, it has been proposed for the Lambda disks to be made up of only double-sided silicon strip sensor. In this conceptual design, the outer ring has been kept similar to the outermost layers of the MVD forward disks and inner layer of Lambda disks has been designed using silicon strip sensor but of different size.
At present, we are involved in simulation studies of the Lambda disks detector with proton anti-proton to lambda anti-lambda to calculate reconstruction efficiency and resolution of this channel. This channel provides essential inputs in understanding the vertex reconstruction of hyperon pairs. We have also started to study different parameters related to the development of the Lambda disks detector.
In this presentation we will report about the reconstruction efficiency and identification probability of Lambda and Anti-Lambda particles with and without the Lambda disks detector. In addition, simulation study of detector coverage, material budget, radiation damage and rate estimation with the Lambda disks detector which are essential for the development of the detector will be presented.

Primary author: Mr KUMAR, Ajay (Indian Institute of Technology Indore)

Co-author: Dr ROY, Ankhi (Indian Institute of Technology Indore)

Presenter: Mr KUMAR, Ajay (Indian Institute of Technology Indore)

Session Classification: Poster presentations

Track Classification: Event Processing, Simulation and Analysis