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The STAR Heavy Flavor Tracker and Upgrade Plan

Tuesday 29 September 2015 15:00 (20 minutes)

The Heavy Flavor Tracker (HFT) of the STAR experiment at RHIC is the first application of the state-of-the-art thin Monolithic Active Pixel Sensors (MAPS) technology in a collider environment. The HFT, composed of two silicon PiXeL detector (PXL) layers, an Intermediate Silicon Tracker (IST) and a Silicon Strip Detector (SSD), greatly improves the impact parameter resolution of STAR tracking and enables reconstruction of hadronic decays of heavy flavor mesons and baryons in the heavy ion collision environment, providing unique probes for studying the Quark-Gluon Plasma. In this talk we will discuss the HFT hardware design, and current detector status and performance.

The HFT was successfully commissioned during the 2014 RHIC run, taking data in Au+Au collisions at 200 GeV. The HFT performance during this run matches the expected performance, most significantly for track pointing resolution. We will show preliminary results from 2014 Au+Au data analyses, demonstrating the capabilities of charm reconstruction with the HFT. We will also describe recent modifications to HFT subsystems to improve its reliability, material budget, and tracking in the 2015 run, when the HFT has been taking data in p+p, p+Au and p+Al collisions at $\sqrt{s_{NN}} = 200$ GeV.

In order to extend these capabilities of measuring bottom quark hadrons at RHIC energies, a faster heavy flavor tracker (HFT+) is needed to collect data at higher luminosity with good efficiency. The proposed HFT+ will be equipped with new generation of MAPS sensors with a much shorter integration time (≤ 20 μ s) and possibly extend the current PXL detector acceptance with minimal modification to the original mechanical and air cooling infrastructure. Requirements for the upgraded HFT+ detector and expected performance will be also presented in this talk.

On behalf of collaboration:

STAR

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