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Type: **Invited Talk**

MAPS-based Vertex Detectors: Operational Experience in STAR and Future Applications

Monday 11 September 2017 15:40 (25 minutes)

The STAR PiXeL detector (HFT PXL) at RHIC is the first application of the thin Monolithic Active Pixel Sensors (MAPS) technology in a collider environment. It is based on 50 μm -thin MAPS sensors with a pitch of 20.7 μm . The sensor is read-out in rolling shutter mode in 185.6 μs . The 170 mW/cm² power dissipation allows for air cooling and contributes to reducing the global material budget to 0.4% radiation length on the innermost layer. This system took data in Au+Au collisions, p+p and p+Au collisions at $\sqrt{s_{\text{NN}}}=200$ GeV at RHIC, during the period 2014-2016. Operational experience and lessons learned from the construction and the 3 years of data-taking will be presented in this talk. Detector performance and results from 2014 Au+Au data analysis, demonstrating the STAR capabilities of charm reconstruction, will be shown. Following this successful experience, the next-generation MAPS sensor, featuring an integration time shorter than 20 μs , will be used to upgrade the ALICE Inner Tracking System (ITS) at LHC and has been proposed for the vertex detector (MVTX) for sPHENIX, the future nuclear physics experiment for the study of the QGP planned for RHIC. A short outlook on these future applications will conclude the presentation.

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Session Classification: Operational Experience on Current detectors