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sPHENIX track reconstruction in streaming-readout data

The sPHENIX experiment is a next-generation collider detector at RHIC designed for rare jet and heavy flavor probes of the Quark-Gluon Plasma. The experiment includes a suite of precision tracking detectors for measurements of jet structure, open heavy flavor, and quarkonia. The tracking system includes a MAPS-based silicon pixel detector, a fast silicon strip detector, a compact time projection chamber, and a micromegas-based outer tracker. In 2024 all tracking detectors were successfully commissioned and collected a large sample of proton-proton collision data, and a pilot sample of Au-Au collision data, at center-of-mass energies of 200 GeV. This includes a unique hybrid streaming readout data sample that enables the collection of a very large unbiased p-p collision dataset, where the tracking detectors continuously readout all collisions for up to $50\mu s$ after a calorimeter triggered or minimum bias collision. In this talk, the development and status of the sPHENIX 4D tracking reconstruction and calibration with collision data utilizing the ACTS tracking package will be presented. This constitutes the first use of ACTS with data in a high energy nuclear physics experiment.

Category

Experiment

Collaboration (if applicable)

sPHENIX Collaboration

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