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Combined Streaming and Triggered data taking with the sPHENIX Detector

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The new sPHENIX detector at RHIC will begin commissioning with Au+Au collisions at 200 GeV in Spring 2023, followed by p+p and p+Au data taking in 2024. The experiment combines triggered readout of the calorimeter system with streaming readout of the tracking detectors in a hybrid readout scheme. The hybrid readout scheme enables a large increase in the collected statistics in particular for p+p and p+Pb collisions at RHIC, leading to an enhancement in integrated luminosity for low p_T heavy-flavor measurements by more than two orders of magnitude.

We will present an overview of the detectors and their readout, the design and functioning of the DAQ system, and its performance. We will explain how sPHENIX has implemented the streaming readout, which is the planned readout mode for future experiments like, e.g., ePIC, for the participating detector systems. The operational and performance experience in the first data taking run will be discussed, and the event statistics collected for key physics channels will be presented.

Category

Experiment

Collaboration (if applicable)

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