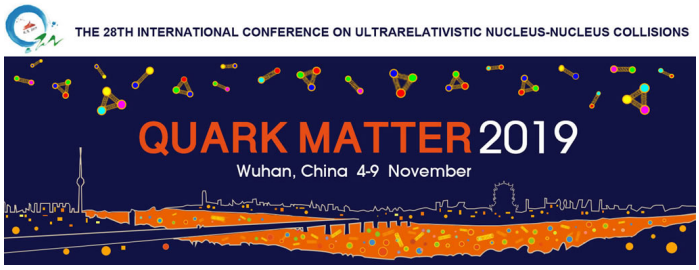

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Streaming readout of the sPHENIX detector

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The sPHENIX detector at BNL's Relativistic Heavy Ion Collider (RHIC) will enable a comprehensive measurement of jets in relativistic heavy ion collisions. The detector will cover the full azimuth and a pseudorapidity range of $|\eta| < 1.1$. The tracking system will consist of a silicon detector (MVTX) based on MAPS (Monolithic Active Pixel Sensors), followed by an Intermediate Tracker (INTT), and then by a TPC. The calorimetry system consists of an electromagnetic calorimeter, and, for the first time at a RHIC experiment, a mid-rapidity hadronic calorimeter.

The calorimeter signals are sampled with silicon photomultipliers and waveform digitizing electronics. The digitized waveforms are read out with custom PCIe boards in a "classic" event-driven scheme. Conversely, the three tracking detectors are read out in streaming mode, where data are pushed from the front-end and captured continuously. Only streaming data overlapping with RHIC beam crossings that were triggered for the calorimeter readout are permanently stored.

Streaming readout is widely believed to be the readout method best suited for the detectors at a future Electron-Ion Collider. A sPHENIX TPC prototype has successfully been read out with near-final readout electronics at the Fermilab test beam in streaming mode. The analysis of the streaming data is under way. We will give an overview of the streaming readout technology and present the advantages of the technology, and highlight results from the test beam.

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