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Characterizing Time-Averaged Distortions in the sPHENIX TPC with the TPC Outer Tracker

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The sPHENIX Time Projection Chamber (TPC) serves as the main tracking detector of the sPHENIX experiment, which began operating at the Relativistic Heavy Ion Collider at Brookhaven National Lab this year. It operates with a quadruple-GEM avalanche stage which provides gain while restricting the flow of ions back into the chamber sufficiently to operate in streaming mode, without any additional gating. However, in order to reach its design performance, the time-varying distortions due to the fields of the remaining ion backflow and primary ionization must be monitored and corrected. The slowly varying component of the distortions is monitored by the TPC Outer Tracker (TPOT), a micromegas-based detector which provides an additional spacepoint for tracks within a limited azimuthal range. This spacepoint enables a data-driven extraction of the distortion vectors within the detector, which can then be extrapolated to the entire chamber. This poster presents the design of the TPOT and methods used to extract the appropriate corrections to these moderate-timescale distortions

Category

Experiment

Collaboration (if applicable)

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