

The GMT detector alignment in the STAR experiment

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The Solenoidal Tracker At RHIC (STAR) uses the Time Projection Chamber (TPC) in order to perform tracking and the particle identification. With increasing statistics, it has become critical to reduce systematic uncertainties due to TPC alignment and distortion corrections (such as space charge, which has also grown with increasing luminosity). In order to improve these corrections and monitor non-static distortions, GEM-based chambers (GMT) were installed at eight locations outside TPC at the Time-Of-Flight (TOF) radius where they will provide the maximum sensitivity to the distortions. The GMT should have resolution ~ 150 μm in both longitudinal (drift) and transverse directions and should be aligned with regard to the TPC by ~ 200 μm . To serve that purpose we developed the software (Cluster Finder) that searches for clusters in ADC signals of each module in both directions (longitudinal and transverse) after the pedestal subtraction and measure its positions and deviations. By using this information the alignment procedure of the modules with regard to TPC has been completed and the required resolution was achieved.

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