STAR Forward Silicon Tracker: Characterizing Prototype Module Performance with Cosmic Rays and Simulation Studies

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The STAR forward upgrade includes a Forward Silicon Tracker (FST) based on silicon strip sensor technology, providing track reconstruction for charged particles with full azimuthal coverage in the rapidity range of $2.5<y<4$. The FST prototype modules were tested and calibrated with cosmic rays using Inner Silicon Tracker (IST) staves for track alignment. Detection efficiency and position resolution of the prototypes were measured, and their dependencies on operating conditions and clustering algorithms were studied. Since track reconstruction is contingent on the efficiency and resolution of individual FST modules, more realistic predictions of charged particle detection with the FST can be produced from MC simulation using the results measured with the prototypes. In this talk, we will discuss the cosmic ray and simulation studies with the FST prototypes.