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Performance simulations of the Silicon Tracking System of the CBM Experiment at FAIR

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The Compressed Baryonic Matter (CBM) experiment at the future Facility for Antiproton and Ion Research (FAIR) aims to study the properties of nuclear matter at high net-baryon densities and moderate temperatures. The Silicon Tracking System (STS) is the key detector to reconstruct with a high efficiency up to 1000 charged particle trajectories created in heavy-ion collisions at interaction rates of up to 10 MHz. It will determine the momentum of the particles with a momentum resolution $\Delta p/p \approx$ 1-2% which requires ultralow detector material budget of 0.3-1% X0 per layer. The detector comprise eight layers of double-sided silicon microstrip sensors and will be placed inside the 1 Tm superconducting magnet. This poster contribution describes the simulated analog and digital response of the STS and its performance with regard to different geometries, sensor layouts and varied sensor thicknesses. Key metrics such as track and primary vertex reconstruction efficiencies, momentum resolution will be presented. In addition the effect of delta-electrons originating from beam-target interactions on the detector performance and read-out data rates will be shown.

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