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Development of Tracking Detector with GEM

We developed position sensitive gas detector with Gas Electron Multiplier (GEM) for tracking of charged particle. Our physics goal is to study the short range correlation of the nuclear interaction in the nuclear medium with a Coherent Pion Production (CPP) experiment. The experiment is performed at the neutron time of flight facility (NTOF) at RCNP with the $^{12}\text{C}(p, n\pi^+)^{12}\text{C}(\text{ground state})$ reaction at the beam energy of 392 MeV. The produced π^+ s are bent by the dipole magnet, and detected by the tracking detector installed inside the magnet. In order to identify the CPP event, high energy resolution for π is needed. Therefore high position resolution is required to analyze the π^+ 's momentum. Moreover, because tracking detector is placed in the magnet which close to the reaction point, it must be able to be operated under the high magnetic field about 1Tesla and harsh radiation environment. In order to satisfy these requirements, we develop the detector with Gas Electron Multiplier (GEM). The spatial resolution of $100\mu\text{m}$ will be achieved by using two dimensional readout board with $400\mu\text{m}$ pitch strips. We report about the performance of GEM detector and the result of recent experiment performed at RCNP.

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