

GEM based TPC for the high intensity beam at J-PARC

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The time projection chamber(HypTPC) has been developed for the H-dibaryon search experiment via (K^-,K^+) reactions at J-PARC. The high rate secondary beam up to 10^6 Hz from the world highest intensity proton beam should be taken into account. The HypTPC has the octagonal drift volume defined by the field cage, the cathode plane at the top and the amplification region at the bottom. The drift length is 55 cm. The Helmholtz type superconducting magnet applies the uniform magnetic field to the drift volume of the TPC. The target is located at 143 mm upstream from the center of TPC inside the drift volume. The outermost gas vessel is filled with P-10 gas. To avoid the charge build-up of field cage in the high rate beam, we cut the exposed insulator part of field cage around beam through region. When charged particles pass through the gas volume, ionized electrons along the track drift downward to first meet the gating grid plane and then triple GEMs, which are adopted to reduce ion back flows in the high rate beam. The amplified electron signals from GEM can be read out by almost 6000 pads which has a concentric configuration around the target. The GET(Generic Electronic System for TPCs) is used for the data acquisition. We adopted the partial readout mode and the zero suppression to reduce the dead time of DAQ combined with (K^-,K^+) trigger at the high beam intensity. We will report commissioning of the HypTPC and the DAQ performance test.

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