

Precision tracking micro-pattern gaseous detectors at Budker INP

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Micro-pattern gaseous detectors (MPGDs) can operate at very high particle flux demonstrating consistently high efficiency and coordinate resolution in tens microns scale. Tracking MPGDs are developed and applied in several experiments at Budker INP.

Eight two-coordinate cascaded Gas Electron Multiplier based detectors (GEM-detectors) have been working at the Tagging System of KEDR experiment (TS KEDR) at VEPP-4M electron-positron collider since 2010. TS KEDR is dedicated to two-photon physics.

Three triple-GEM-detectors are integrated into Photon Tagging System of the DEUTERON facility at VEPP-3 storage ring. Strip pitch of the readout structure is 500 μm and the spatial resolution was measured to be less than 50 μm . The material budget of each detector is low - about 0.3% of radiation length, which suppresses multiple scattering.

Triple-GEM detectors having orthogonal strips with a pitch of 250 μm and low material budget were assembled for the Test Beam Facility and demonstrated excellent efficiency above 99% and spatial resolution better than 50 μm .

Cascaded GEM-detector with pad readout has been mounted for the laser polarimeter for precise energy measurements at VEPP-4M collider.

MPGD is proposed for upgraded tracking system of the CMD-3 detector at VEPP-2000 collider. The upgraded system will include a new cylinder tracking and trigger detector as well as two end-cap discs. Micro-RWELL technology is used for the upgrade. The first two end-cap discs are assembled and results of the first tests will be reported.

The cylindrical detector and end-cap discs for CMD-3 are considered as the prototypes for the Inner Tracker of future Super Charm-Tau Factory. Compact Time Projection Chamber (TPC) is considered as one of the options for the Inner Tracker with the readout detector based on MPGD technology. The prototype of the TPC is being assembled and the first tests with the prototypes of the readout plane will follow soon.

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