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A time projection chamber with MPGD-based readout

For the International Large Detector (ILD) concept at the planned International Linear Collider (ILC), the use of time projection chambers (TPC) with Micro-Pattern Gas Detector (MPDG) readout as the main tracking detector is investigated. The TPC is designed to provide 220 three dimensional points for continuous tracking with a single-hit resolution better than $100\mu\text{m}$ in $r\phi$, and about 1 mm in z . In this contribution, recent results from a prototype TPC, placed in a 1 T solenoidal field and read out with three independent Gas Electron Multiplier (GEM) based readout modules, are reported. The TPC was exposed to a 6 GeV electron beam at the DESY II synchrotron. The efficiency for reconstructing hits, the measurement of the drift velocity, the space point resolution and the control of field inhomogeneities are presented. Two other MPGD concepts are being developed for the TPC: Micromegas and GridPix. Fundamental parameters such as transverse and longitudinal spatial resolution and drift velocity have been measured. In parallel, a new gating device based on large-aperture GEMs have been produced and studied in the laboratory. In this talk, the track reconstruction performance results and the next steps towards the TPC construction for the ILD detector will be reviewed.

Time Zone

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