



Contribution ID: 58

Type: **Contributed Talk**

Micromegas TPC studies at high magnetic fields using the charge dispersion signal

Tuesday 20 February 2007 14:50 (20 minutes)

The Time Projection Chamber (TPC) for the International Linear Collider (ILC) will measure about 200 track points with a resolution close to 100 μm . A Micro Pattern Gas Detector (MPGD) readout TPC may achieve the target resolution with existing techniques using 1 mm or narrower pads at the expense of increasing the detector cost and complexity. The new MPGD readout technique of charge dispersion has the potential to achieve good resolution without resorting to narrow pads. This has been demonstrated with 2 mm \times 6 mm TPC readout pads for the GEMs and the Micromegas in cosmic ray tests and in a beam test at KEK in a 1 T magnetic field. The charge dispersion readout concept has been tested for the first time in a high field super-conducting magnet at DESY using a Micromegas-TPC. The measured Micromegas gain has been found to be constant within 0.5% for magnetic fields up to 5 T. The measurement results and the TPC resolution performance for cosmic rays at high magnetic fields will be presented.

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Session Classification: Session 4