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MEG II drift chamber prototype characterisation with the silicon based cosmic ray tracker at INFN Pisa

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High energy physics experiments at the high intensity frontier place ever greater demands on detectors, and in particular on tracking devices. In order to compare the performance of many possible small size tracking prototypes, a high resolution cosmic ray tracker has been assembled to be used as an external track reference. It consists in an assembly of four spare ladders of the external layers of the Silicon Vertex Tracker of the BaBar experiment. The test facility, operating at INFN Sezione di Pisa, provides the detector under test with an external track with an intrinsic resolution of 15-30- μm . The DAQ originally used in the BaBar experiment was replaced by custom design boards coupled with an acquisition front-end PC through commercial FPGA evaluation boards. We present the performance in terms of tracking resolution and efficiency. A first device designed as a small prototype of the new drift chamber of the MEG II experiment has been characterised in many configurations. The MEG II tracker is conceived as a unique volume wire drift chamber filled with He-Isobutane 85-15%. The ionisation density in this gas admixture is of about 13 clusters/cm and an appreciable bias of the impact parameters for tracks crossing the cell close to the anode wire is predicted.

We present the telescope performance in terms of tracking efficiency and resolution and the results of the characterisation the MEG II drift chamber prototype.

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