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The micro-Resistive WELL technology for IDEA apparatus

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The project of a circular collider for electrons and positrons (FCC-ee) needs to be completed with a detecting apparatus. The Innovative Detector for Electron-positron Accelerator (IDEA) has been proposed to study with more precision the properties of heavy particles as top, Z, W and H.

From vertex outward, the apparatus is composed of an Inner Tracker and a Drift Chamber surrounded by a magnet, a pre-shower, a calorimeter and eventually the muons system. For the pre-shower and the muon system the technology proposed is presently the micro-Resistive WELL, since its ductility can adapt such detectors to both systems.

The pre-shower asks for less than 100 um space resolution to tag the photons and the neutral pions, while the muon system needs space resolution of the order of 400 um. Another point in favor of this technology is the present technological transfer, fundamental for mass production to cover more than the 1500 m² planned for the apparatus.

First, we will review the standard 1D tracking performance of the micro-RWELL, including the dependence of spatial resolution on DLC resistivity, strip pitch, and the study of performance for inclined tracks based on micro-TPC reconstruction of track segments inside the detector gas gap. Then, we will report on the R&D of different 2D readout layouts as well as a hybrid GEM-microRWELL layout. All these studies have been conducted over several test beam campaigns performed at the H8-SpS CERN North area during the last years.

Primary experiment

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