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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 μm space resolution to tag the photons and the neutral pions, while the muon system needs space resolution of the order of 400 μm . Another point in favor of this technology is the present technological transfer, fundamental for mass production to cover more than the 1500 m^2 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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