

Gasless Gaseous Detectors.

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Abstract

A GridPix detector is a gas-filled Time Projection Chamber with a pixel readout as anode. Gas gain is realised by means of a grid, placed parallel to the pixel chip at a distance of 50 μm . With this, all primary electrons, generated by ionisation of the gas in the TPC volume, can be detected individually, in four dimensions. The MEMS technology, developed for the integration of the grid and the pixel chip, can be applied to produce a stack of grids. By applying potential differences on these grids, and placing the stack in vacuum, the grids act as dynodes of a photomultiplier, and a thin, MEMS-made, ultra-fast multiplier could be realised. Another project is the development of Electron Emission foil. If a high-energetic charged particle traverses through, for instance, an aluminum sheet, then a low-energetic electron is emitted, close to the crossing point, in about 4 percent of the cases. This fraction is higher if low exit-potential (ceramic) materials are applied. Since only the skin of the surface participates to this process, the efficiency of such a foil could increase if the effective surface is made larger by roughening. The combination of the electron multiplier and the EE-foil could result in a fast, precise, light and rad-hard tracker.