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from Silicon-, via Gas-, towards Foil tracking detectors

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The GridPix detector is a Time Projection Chamber with a pixelized readout anode.

With a drift gap of 1 mm, the gas layer functions as the Si sensor of a Si pixel or Si strip detector.

With a drift gap of 20 mm, GridPix can accurately reconstruct the path of, and measure the energy of photo- and Compton electrons associated with photon absorption. With this information, the polarization of the photons can be obtained.

The application of GridPix in bi-phase LAr or LXe WIMP-search experiments is under study.

The essential gas amplification occurs in the gap between the Integrated Grid (InGrid), made by means of MEMS technology, and the pixel chip. The same MEMS technology can be applied for creating a stack of grids. By putting the grids on decreasing potentials, they could act as dynodes of a photomultiplier. In this way, a thin and flat electron multiplier could be made.

In another development, the emission of low-energetic electrons from a surface, due to the passage of a charged particle, is under study. With low work function materials (CsI, diamond, Si-nitride), combined with a fractal-like increase of the effective surface, high-efficiency Electron Emission Foils may be feasible.

Primary author: Dr VAN DER GRAAF, Harry van der Graaf (Nikhef)

Presenter: Dr VAN DER GRAAF, Harry van der Graaf (Nikhef)

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