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A Large Area GEMPix detector for treatment plan verification in hadron therapy

Thursday 28 May 2020 09:00 (18 minutes)

We propose a novel detector for quality assurance in hadron therapy, for which an accurate dose calculation and verification with high spatial accuracy are required. For this purpose, a promising tool is the GEMPix detector, which combines a triple GEM (Gas Electron Multiplier) and a quad Timepix ASIC used as highly pixelated readout. The GEMPix (active area 28x28 mm^2) is capable of providing 2D images of the beam with high spatial resolution, the Bragg curve and the 3D energy deposition. Although promising, a wider sensitive area is required to cover the typical radiation field size and to avoid losses due to beam spread out.
We present an original solution named LaGEMPix by replacing the ASIC by a matrix of organic photodiodes coated on an oxide thin film transistor backplane produced by Holst Centre/TNO. We combined the two technologies and developed this innovative detector to achieve a wider area (60x80 mm2) imaging detector and to fully exploit its optical readout capability.

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