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A 3D Diamond Detector for Particle Tracking

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A novel detector using single-crystal chemical vapor deposited diamond and resistive electrodes in the bulk forming a 3D diamond detector is presented. The electrodes of the device were fabricated with laser assisted phase change of diamond into a combination of diamond like carbon, amorphous carbon and graphite. The connections to the electrode of the prototype device were made using a photo-lithographic process. The electrical and particle detection properties of the prototype device were investigated. A prototype detector system consisting of the prototype 3D device connected to a multi-channel readout was successfully tested with 120 GeV protons proving the feasibility of the 3D diamond detector concept for particle tracking applications.

Collaboration

RD42 Diamond Detector Collaboration

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