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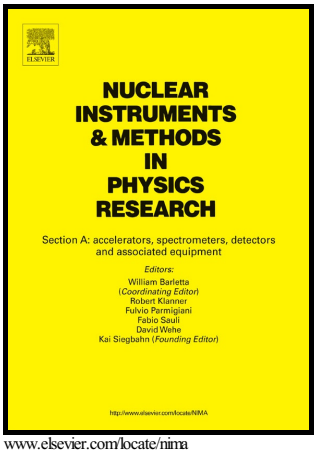

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Diamond detectors with laser induced surface graphite electrodes

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Abstract

We report on the response of metal-less CVD polycrystalline-diamond pixel sensors under β-particles irradiation. A 21×21 array of 0.18×0.18 mm^2 pixels was realized on one side of a 10.0×10.0×0.5 mm^3 polycrystalline diamond substrate by means of laser induced surface graphitization. With the same technique, a large graphite contact, used for detector biasing, was fabricated on the opposite side. A coincidence detecting method was used with two other reference polycrystalline diamond detectors for triggering, instead of commonly used scintillators, positioned in the front and on the back of the sensor-array with respect to the impinging particles trajectory. The collected charge distribution at each pixel was analyzed as a function of the applied bias. No change in the pulse height distribution was recorded by inverting the bias voltage polarity, denoting contacts ohmicity and symmetry. A fairly good pixel response uniformity was obtained: the collected charge most probable value saturates for all the pixels at an electric field strength of about