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3D Silicon and 3D Diamond detectors for future upgrades of LHC experiments

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I present an overview on the development of cutting edge 3D diamond and 3D silicon detectors for future upgrades of LHC experiments, with a focus on work done in Manchester. A 3D geometry and its beneficial effects on a detectors radiation tolerance, signal speed and power dissipation have been extensively studied in silicon. As such, 3D silicon is a proven technology; it is included in the current phase 0 upgrade of ATLAS, and is a serious candidate for innermost layer tracking detectors at the High Luminosity LHC. Following the success of silicon, we are applying the concept of a 3D geometry to other semiconductor materials, specifically diamond, in the hope of creating a super radiation tolerant detector.

Primary author: HAUGHTON, Iain (University of Manchester (GB))

Presenter: HAUGHTON, Iain (University of Manchester (GB))

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