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## Novel Silicon Structures

Radiation-hard detectors are needed for the High-Luminosity upgrade for the ATLAS experiment at the Large Hadron Collider at CERN. 3D silicon devices are a technology which may be able to provide the required resolution and durability when exposed to ionising radiation. 3D sensors have electrodes processed inside the silicon bulk rather than being implanted on its surface. This paper will present a comparison of the performances of 3D and planar silicon sensors, both connected to pixel-based TimePix readout chips. The 3D detector was found to have less charge sharing and to operate at a lower bias voltage than the planar detector, due to the smaller electrode separation in the latter.

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