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## New beam test results of 3D pixel detectors constructed with poly-crystalline CVD diamond

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Detectors based on Chemical Vapor Deposition (CVD) diamond have been used extensively and successfully in beam conditions/beam loss monitors as the innermost detectors in the highest radiation areas of Large Hadron Collider (LHC) experiments. Over the last two years the RD42 collaboration has constructed a series of 3D pixel detectors using CVD diamond as the active material and laser fabricated columns in the bulk and characterized them in test beams. The electrical properties and latest beam test results from 2017 and 2018 of the efficiency and spatial resolution of the most recent 3D pixel detectors constructed with poly-crystalline CVD diamond will be presented and compared. Our results indicate that the 3D geometry with 50 micron x 50 micron cells ganged in a 1x5 or 3x2 arrangement to match the available pixel readout electronics collected, for the first time, more than 90% of the deposited charge in a poly-crystalline CVD diamond detector. In addition, the effects on charge collection in poly-crystalline CVD 3D diamond pixel devices due to radiation will be discussed.

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