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Diamond Sensors for HE Frontier Experiments

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With the first three years of the LHC running complete, ATLAS and CMS are planning to upgrade their innermost tracking layers with more radiation hard technologies. Chemical Vapor Deposition (CVD) diamond is one such technology. CVD diamond has been used extensively in beam condition monitors as the innermost detectors in the highest radiation areas of BaBar, Belle, CDF and all LHC experiments. This talk will describe the lessons learned in constructing the ATLAS Beam Conditions Monitor (BCM) and ATLAS Diamond Beam Monitor (DBM) both of which are based on CVD diamond with the goal of elucidating the issues that should be addressed for future diamond based detectors. The talk will also present the first beam test results of prototypes of the 3D detector geometry in diamond which should further enhance the radiation tolerance of this material.

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