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Results on Radiation Tolerance of Diamond Detectors

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At present most experiments at the CERN Large Hadron Collider (LHC) are planning upgrades in the next 5-10 years for their innermost tracking layers as well as luminosity monitors to be able to take data as the luminosity increases and CERN moves toward the High Luminosity-LHC (HL-LHC). These upgrades will most likely require more radiation tolerant technologies than exist today. As a result this is one area of intense research. 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 recent radiation tolerance measurements of the highest quality polycrystalline CVD material for a range of proton energies, pions and neutrons obtained with this material with the goal of elucidating the issues that should be addressed for future diamond based detectors. The talk will also discuss the new results on the evolution of various semiconductor parameters as a function of dose.

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