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# Development of a System for Luminosity and Abort at the LH-LHC based on polycrystalline CVD diamond

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The High Luminosity upgrade of Large Hadron Collider (HL-LHC) will increase Large Hadron Collider Luminosity by an order of magnitude increasing the density of particles on the detector by an order of magnitude as well. For protecting the inner detectors of experiments and for monitoring the delivered luminosity a radiation hard beam monitor is being developed. We propose a set of detectors based on poly-crystalline Chemical Vapor Deposition (pCVD) diamonds and dedicated Application Specific Integrated Circuits. Due to the large range of particle flux through the detector, flexibility is very important. To satisfy the constraints imposed by the HL-LHC we propose a solution based on segmenting each single diamond sensor into multiple devices of varying size and reading them out with a new multichannel readout chip.

In this talk we describe the proposed system and present results from the first prototypes of multichannel pCVD diamond sensors with devices ranging in area from approximately 1mm^2 to approximately 32mm^2 readout with a prototype FE amplifier chip. The prototype system was characterized in test beams with 120 GeV hadrons at the CERN SPS. Preliminary results in measuring the amplitude distribution across the pad area will be presented at different negative and positive voltages from 1V/um to 2V/um. In addition the noise distribution and efficiency for measuring single MIPs was determined. Based on the preliminary results a proposal for further development of the system will be discussed.

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