

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

Monday, 25 May 2020 19:18 (5 minutes)

The High Luminosity upgrade of Large Hadron Collider (HL-LHC) will increase LHC Luminosity by an order of magnitude increasing the density of particles on the detector by an order of magnitude. For protecting the inner detectors of experiments and for monitoring the delivered luminosity, a radiation hard beam monitor is being developed. We are developing a set of detectors based on poly-crystalline Chemical Vapor Deposition (pCVD) diamonds and a dedicated ASIC. Due to the large range of particle flux through the detector, flexibility is very important. To satisfy the constraints imposed by the HL-LHC, our solution is 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, present preliminary results from the first detectors fabricated using our prototype ASIC and present the noise distribution and efficiency for single MIPs.

Funding information

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Session Classification: Poster

Track Classification: Sensors