

## Development status of a novel proton irradiation site at the HISKP isochronous cyclotron Bonn

Monday 26 November 2018 11:00 (20 minutes)

The development status of a novel proton irradiation site for silicon detectors is presented. The site is located at the isochronous cyclotron of the HISKP (Helmholtz Institut für Strahlen- und Kernphysik) of the University of Bonn. The cyclotron provides protons with up to 14 MeV kinetic energy with beam currents between a few nA and 1  $\mu$ A. Light ions, such as deuterons,  $^3,^4\text{He}$  or  $^{12}\text{C}$ , can also be produced with kinetic energies from 7 to 14 MeV per nucleon. The beam spot at extraction can be adjusted from a few mm to approximately 2 cm in diameter. An electron-cyclotron-resonance (ECR) source with low source-noise enables a stable beam over time. Dedicated secondary-electron monitors with custom readout electronics have been developed for on-line beam-current and position monitoring. The intrinsic resolution of the readout electronics allows to measure the secondary-electron current with a precision of 1%. The goal is to measure the primary beam current with comparable precision in order to reduce the uncertainty on the proton fluence at the device. Preliminary beam-current calibrations are shown. GEANT4 simulations of energy distributions along the beam line up to the setup conclude a proton hardness factor of  $\kappa \approx 3$ , allowing to irradiate up to  $10^{16} \frac{\text{n.e.g}}{\text{cm}^2}$  in 60 minutes. The intended irradiation parameters such as temperature, scanning and shielding are presented as well as plans for measurements of proton and deuteron hardness factors.

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**Session Classification:** Defects and Material Characterization