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Determination of proton hardness factors with commercial PiN diodes

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The radiation hardness of detectors is of paramount importance for the success of the scheduled High Luminosity upgrade of the CERN Large Hadron Collider. This has driven a global campaign for sensor characterisation and irradiation testing facility qualification. The effect of radiation damage from various particle species and energies are conventionally communicated in terms of the equivalent 1 MeV neutron fluence, related by a hardness factor. The University of Birmingham, in collaboration with CERN and Karlsruhe Institute of Technology, have performed a campaign of measurements to determine the proton hardness factor at several irradiation facilities, using commercial BPW34F PiN diodes. Recently, Bonn University has commissioned a proton irradiation facility at Bonn Isochronous Cyclotron of Helmholtz Institut für Strahlen- und Kernphysik (HISKP) and utilised the same technique to estimate the corresponding hardness factor. The diodes used in this study have now been measured at the University of Birmingham, following an identical procedure to the earlier studies. A summary of the measurement campaigns will be given and the results of recent measurements of these diodes will be reported.

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