

Master-Thesis

Silicon PIN Diodes as Detectors for secondary neutrons at proton therapy facilities

Proton therapy is a modern radiation therapy technique, and the number of proton therapy facilities increases all over the world. Secondary radiation like neutrons and photons and their dose to healthy tissue are controversially discussed, because of the unknown associated secondary cancer risk.

In order to determine the secondary neutron dose to patients, silicon PIN detectors with different converter materials will be used for measuring inside anthropomorphic phantoms. These detectors were originally developed at Helmholtz Zentrum München in the working group of Individual Dosimetry for an active neutron dosimeter, which is in routine use. During a Bachelor-Thesis these active detectors were already tested inside a phantom at a proton therapy facility.

In order to determine the response of the silicon PIN detectors inside a phantom systematically, measurements at a proton therapy facility are planned and Monte-Carlo simulations of the detector response with Geant4 should be performed in cooperation with an ongoing PhD-Thesis.

Essential Knowledge/Skills:

- C++ and/or experiences in Geant4
- Linux
- Nuclear physics
- Semiconductor detectors and radiation measurements

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