**Titel des Projekts**

Improving patient dosimetry and electronic radiation hardness testing by LET characterisation of particle beams

Antragsteller: Björn Poppe, Sytze Brandenburg, Dr. Stephan Both, Hui Khee Looe, Kay C. Willborn

**Zusammenfassung des Projekts**

Modern radiotherapy offers the application of a wide variety of high-energetic radiation types ranging from conventional modalities such as photons and electrons to heavier particles as Protons, Helium- or Carbon Ions. To compare the different radiobiological effectiveness of the radiation types inside the patient, the rate of energy deposition along the particles track, termed as the Linear Energy Transfer (LET), is one of the most important quantities used clinically. The accuracy of LET measurement methods in radiotherapy suffers from problems in spatial resolution and applicability in clinical beams. Electronical components used in space; aviation; particle accelerators and radiotherapy treatment rooms and ground-based applications such as pacemakers; defibrillators and board computers in vehicles can be damaged by radiation as well. The sensitivity of these components against radiation damages is also characterized by using the LET spectrum of the particle beams.

In this project, new strategies to measure the LET will be developed based on silicon and diamond detectors. The detectors will be calibrated to measure LET distributions in relevant radiation fields. Due to the availability of different beams in Groningen/Oldenburg (ranging from photons and electrons to ions) and of other accelerators within our collaboration (e.g. at CERN, MedAustron-Vienna, PTB-Braunschweig), LET comparisons can be performed in a range of radiation fields covering clinically and technologically relevant areas. Outcomes will guide the developments in radiotherapy, radiobiology and radiation resistant electronics. The project will strengthen the collaboration between Oldenburg and Groningen. It will extend the RADSAGA network into the medical area underlining future participations of Oldenburg in follow-up proposals within international networks. The project offers an excellent possibility for the PhD student to participate and study in an international outstanding cooperation.