FIAS Colloquium

Thursday, February 16, 2012, 14:30
FIAS, Ruth-Moufang-Str. 1, 60438 Frankfurt am Main
Lecture hall 0.100

Speaker: PD Dr. Katia Parodi, Heidelberg Ion Beam Therapy Center at the Heidelberg University Hospital, Heidelberg, Germany

Title: Monte Carlo modeling and in-vivo imaging to support high precision ion beam therapy

Ion beams offer favourable physical and radiobiological (for ions heavier than protons) properties for superior tumour-dose conformality and better sparing of surrounding healthy tissue with respect to conventional electromagnetic radiation in external radiotherapy. In Germany, following the promising clinical experience at the Helmholtzzentrum für Schwerionenforschung, the dedicated hospital-based Heidelberg Ion Beam Therapy Center (HIT) has been recently realised to investigate the therapeutic advantages of different ion beams in the clinical environment. In this context, several research activities and projects are ongoing in order to promote advances in the clinical exploitation of actively scanned proton and carbon ion beams for high precision radiation therapy, as well as in preparation of the clinical introduction of novel ion beam species such as oxygen beams.

In this talk an overview of the main activities of the Monte Carlo modeling and in-vivo imaging research group at HIT will be provided, with focus on 1) the experimental characterization and modelling of therapeutic ion beams for generation of basic data for Treatment Planning Systems, 2) the integration of a general purpose Monte Carlo computational framework in the clinical environment for an automated workflow of patient-specific simulations, 3) the establishment and evaluation of post-radiation Positron-Emission-Tomography/Computed-Tomography imaging for in-vivo treatment verification as well as 4) the investigations towards novel imaging modalities for in-vivo beam range assessment.