平成２６年度 《第７回》

重粒子線医工連携セミナー

平成２６年１１月４日（火） １６：００～

場所： 群馬大学重粒子線医学センター カンファレンス室

“ Develoment and characterisation of novel silicon detectors for Quality Assurance in Proton and Heavy Ion Therapies with sub-mm spatial resolution“

Dr. Susanna Guatelli

Centre For Medical Radiation Physics (CMRP),
University of Wollongong, Wollongong, NSW, Australia

The Centre For Medical Radiation Physics is a research/education strength of the University of Wollongong, dedicated to the development of novel, innovative Quality Assurance (QA) detectors for radiotherapy, including Intensity Modulated Radiation Therapy (IMRT), brachytherapy, Proton Therapy (PT) and Heavy Ion Therapy (HIT).

In this talk, novel silicon detector technology will be presented as possible innovative QA solutions for PT and HIT to improve the benefit of these radiation oncology modalities, achieving a spatial resolution (sub-mm) never achieved before.

The need of high spatial resolution detectors for PT and HIT have been demonstrated . A dramatic increase (1.5-1.8) in RBE in the distal part of the Spread Out Bragg Peak (SOBP) in 100MeV PT beam was observed with ΔE-E silicon monolithic telescope while the widely accepted RBE value is 1.1 in PT SOBP. In ^{12}C HIT, the rapid increase of RBE towards the end of SOBP and in its distal part is more dramatic due to higher LET and small straggling of ions and places an even higher demand on the spatial resolution of the RBE knowledge for treatment delivery.

In particular Silicon on Insulator (SOI) microdosimeters, developed by CMRP and collaborators, and monolithic ΔE-E telescope detector will be presented as possible QA solutions to derive dose-equivalent and RBE in the PT/HIT treatment target and nearby organs at risk, with a sub-mm spatial resolution. In the talk it will also be shown how ΔE-E telescope detectors can be used to characterise the mixed radiation field of PT and HIT.

Finally the Dose Magnifying Glass, a novel pixelated-silicon detector developed at CMRP, will be presented as possible solution for PT QA, to measure in real time the depth and lateral dose profiles with spatial resolution 0.05-10 mm and to verify the energy of the proton beam incident on the patient.

Experimental and theoretical characterisation of the novel devices will be object of the talk.

＝共催＝

がんプロフェッショナル養成基盤推進プラン
放射線治療人材養成８大学連携プログラム

博士課程教育リーディングプログラム
群馬大学 重粒子線医工学グローバルリーダー養成プログラム

＝お問い合わせ先＝

群馬大学重粒子線医学研究センター 猪爪（E-mail:inoino@gunma-u.ac.jp）
〒371-8511 群馬県前橋市昭和町3-39-22 TEL: 027-220-8378