

重粒子線医工 連携セミナー



日時 H30年12月4日(火) 17:00~18:00

場所 群馬大学重粒子線医学センター カンファ室

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The lecture will overview R&D program at CMRP on development of radiation semiconductor detectors and readout electronics for advanced medical dosimetry on a medical linac, brachytherapy, interventional radiology and particle therapy. Some outcomes of R&D program are mentioned below.

MO Skin dosimetry in brachytherapy QA and interventional radiology

MO Skin is only detector able to measure the skin dose $H(0.07)$ in real time. Development of MO Skin wireless dosimetry system and its application for *in vivo* dosimetry on medical linac, HDR brachytherapy and fluoroscopically-guided interventional procedures for real time dose quality assurance will be discussed and demonstrated. . . .

QA dosimetry for real-time motion adaptive radiotherapy on LINAC

Real-time adaptive radiotherapy aims to improve radiation treatment through re-optimization of treatment delivery based on patient-specific organ motion during treatment. MLC tracking to adapt beam to the tumor is a solution. We have developed high spatial and temporal resolution monolithic 2D diode array named "MagicPlate-512" which is mimicking tumor motion and allow 2D dose mapping simultaneously with resolution 1mm/1ms. In conjunction with Calypso motion tracking system MP 512 provides an ideal QA system for dynamic MLC allowing retrospectively analyse delivery and errors. These detectors are B-field tolerant and found application for dose QA on MRI Linac

QA in HDR brachytherapy pre-treatment and in vivo treatment delivery verification

Magic Plate (MP) is an array of radiation detectors embedded in a thin kapton substrate utilizing special CMRP technology. Based on MP a novel QA device, named "magic phantom" (MPH), has been developed which allow for the pre-treatment delivery verification of plans in HDR brachytherapy. It assesses source dwell positions, dwell times and compare with TPS in real time. A new metric, the "position-time gamma index", was introduced to quantify the quality of the measured delivery when compared to the treatment plan. Application of MP in a transmission mode for *in vivo* dosimetry on a linac will be presented

Solid State Microdosimetry for RBE and detectors for ion range verifications in ^{12}C ion therapy.

A novel miniature silicon microdosimeter which is based on innovative 3D detector technology has been introduced for RBE QA. It was demonstrated firstly an excellent agreement in RBE obtained with silicon microdosimeter and TEPC. New detector and technique for verification of ion range in proton and HIT with resolution 0.1mm has been developed.



博士課程教育リーディングプログラム
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