ST 3: Poster Session

Time: Wednesday 11:00–12:30 Location: ZEU/0146

ST 3.1 Wed 11:00 ZEU/0146

Large-area-diode based micro-dosimeter concept for a femto-satellite — Roman Bergert, •Nico Krug, Hans-Georg Zaunick, and Kai-Thomas Brinkmann — II. Physics Institute Justus-Liebig-University Giessen

A low-budget micro-dosimeter concept based on a large area diode (5×5 mm^2 sensitive area) and commercial of-the-shelf (COTS) components is designed and integrated to operate on an open-community femto-satellite platform provided by *AmbaSat Ltd.* The satellite platform is limited to a dimension of (3.5×3.5 cm^2) with a space of about 2×2 cm^2 for the dosimeter concept. Besides this challenge of space for the integration of the electronics on the platform, the challenge to operate in free harsh-space environment (radiation, vacuum, temperature) has to be overcome in the concept design. To target these challenges, several stress tests were performed, which will be presented with a performance mapping of the different components for their physical and electrical properties together with a discussion of the device performance.

ST 3.2 Wed 11:00 ZEU/0146

Systematic study of a large data set of CT scans with regard to diagnostic reference levels — •Hanna Eick[1], Lydia Bock[1], Jans Böing[1], Lennart Henkenherm[2], Norbert Lang[2], Christina Westphälinger[2], and Alfons Khoukaz[1] — [1]Institute for Nuclear Physics, Westfälische Wilhelms-Universität Münster — [2]Gesellschaft für Medizinische Physik und Strahlenschutz mbH, Münster

Diagnostic reference levels (DRL) for examinations on humans with ionizing radiation or radioactive sources are reviewed or updated if necessary every three years. These DRLs are determined and published by the Federal Office for Radiation Protection and are based on the data provided by the medical authorities. Each operator of a device with the mentioned types of radiation must provide review values to the medical authorities every two years. The collaboration of our working group from the WWU Münster with the 'Gesellschaft für Medizinische Physik und Strahlenschutz mbH' makes it possible, on the one hand, to analyze a large data set of CT examinations from different devices in various facilities and to shed more light on the DRLs and on the other hand, to develop an analysis program, which enables a fast and uncomplicated evaluation of the recorded data for every CT scanner. The results will be considered in particular in the context of the update of the DRLs published in November 2022 and to the reference levels valid until then. The analyses also make it possible to establish new DRLs for examinations that have not yet been considered.

ST 3.3 Wed 11:00 ZEU/0146

Cell irradiation experiments using a compact ultrafast electron source — •Bastian Löhrl[1], Leon Brückner[1], Julian Freier[1], Luitpold Distel[2], and Peter Hommelhoff[1] — [1]Department Physik, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), 91058 Erlangen — [2]Department Strahlenbiologie, Universitätsklinikum Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), 91054 Erlangen

Dielectric laser acceleration (DLA) could provide new opportunities for radiotherapy [1]. The goal is to build a chip-based (electron) accelerator using nanophotonic structures driven by femtosecond laser pulses. Built into an endoscopic system, such a novel mini-accelerator could be used for highly localized cancer treatment, for example.

Motivated by this goal, we present the successful implementation of a cell irradiation experiment using pulsed electrons. The setup provides a custom-made, compact electron source with adjustable beam energies up to 30 keV. An integrated electrostatic lens enables focusing of the emitted electron beam. The source can provide several thousand electrons per laser pulse. Irradiation-induced DNA double-strand breaks are detected and visualized in different types of cells through γH2AX immunofluorescence staining. We report on the current status of the experiment and the results of the first measurements.

[1] England, R. Joel, et al. "Dielectric laser accelerators." Reviews of Modern Physics 86.4 (2014): 1337.