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MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 26.06.2014, 16¹⁵ Uhr

Seminarraum 127, TUM, Physik II, Erdgeschoss/Nord
Treffen zum gemeinsamen Kaffee 16 Uhr

Prof. Paulo Crespo

(University of Coimbra, Portugal)

May radiobiology and new imaging techniques improve particle and photon radiotherapy ?

Photon, proton, and heavy ion radiotherapy experience today an unprecedented capability for dose conformality. Consequently, literature reviews analyzing clinical results obtained with escalated biologically equivalent doses also indicate improved -but not perfect- clinical outcomes for some pathologies. For such pathologies and others, there exists a quantifiable margin for improvement even when handling solid tumors. One example arises in radiobiology, where more or less complex responses to the radiotherapeutic injury may result in the formation of edema and increased perfusion in the irradiated area due to partial destruction of the microvasculature (among other mechanisms). Can some natural or synthesized chemical agents be applied concomitantly during the course of a radiotherapy treatment in order to enhance tumor cell killing? Intravenous infusion of vitamin C, for example, has been shown to yield positive outcomes for some types of tumors. With these reasons in mind, one of the 18-MeV proton beamlines of the PET cyclotron of the University of Coimbra has been adapted to irradiate an out-of-yoke setup for radiobiology and even radiophysiology studies. In the short-term, cell cultures bathed in different media and small animals subjected to different pharmaceutical are to be irradiated there. On the other hand, we will show by simulation how detecting prompt photons emitted from an object under irradiation may reveal dose-correlated profiles, revealing also the morphology of the tumor and its surrounding healthy-tissue without the need to rotate the patient nor the irradiation source. Normal versus abnormal (but possible) situations will be shown: (1) inflammation of tissue in the nasal cavities, (2) formation of edema or change of brain density in an irradiated region, and (3) patient weight loss or mispositioning in a prostate irradiation.

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