FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 23.01.2020, 16^{15} Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Prof. Peter Dendooven

(KVI-Center for Advanced Radiation Technology and University of Groningen, the Netherlands)

Positron Emission Tomography for real-time verification during proton therapy

In comparison to photon radiotherapy, proton beam radiotherapy generally results in a lower radiation dose to normal tissue, reducing long-term complications and increasing the quality of life of patients. However, the dose distribution delivered during proton therapy is quite sensitive to anatomical changes in the patient, proton range uncertainties and treatment errors. Because of this, several techniques for in-vivo dose delivery verification have and are being developed. We are investigating positron emission tomography (PET) of ^{12}N produced by the proton beam in the patient. The very short half-life of ^{12}N (11 ms) enables quasi real time feedback and precludes biological washout. I will report on recent proof-of-principle demonstrations, showing measurements of the range of ^{12}N production by 150 MeV protons in PMMA targets with a precision of 2.7 resp. 0.9 mm for 10^8 resp. 10^9 protons. These results will be extrapolated to an optimized clinical PET setup. Finally, the roadmap towards clinical implementation will be outlined.

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