GSI – **SEMINAR**

Im KBW-Hörsaal

Darmstadt, Planckstraße 1

Donnerstag, den 6. Apr 2017, 14:00 Uhr

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RadioOnkologie und Strahlentherapie

“ Treatment plan robustness in pancreatic patients treated with scanned ion-beam therapy: Inter- and intra-fractional aspects“

Pancreatic cancer is still an unsolved oncological challenge, however radiotherapy with charged particles has been considered a promising approach to improve the patients overall survival. These patients might benefit from dose escalation, although uncertainties during the beam delivery (intra-fractional) or along the treatment course (inter-fractional) can compromise the accuracy of the treatment.
In this seminar, inter- and intra-fractional anatomy changes are explored in order to define the potential source of uncertainties, quantify their effect, and to define strategies towards their reduction.
Anatomical changes along the course of the treatment show to lead target underdosages up to 20% and an increase in the dose to the normal tissues. However, this can be lowered through the selection of beam arrangements and beam-specific margins. Additionally, weekly monitoring of the patient anatomy using computed tomography might easily be included in the clinical workflow and will assist in the decision of treatment re-planning, when substantial anatomical changes occur.
Regarding intra-fractional variations, the induced breathing motion together with a dynamic beam delivery, affect the dose distribution in terms of homogeneity and target coverage. This effect is stronger for patients with a tumour motion amplitude superior to 5 mm and a highly modulated dose distribution intra- and interfields.
Finally, a first approach to the use of 4D-Magnetic Resonance Imaging (MRI) for motion detection is presented. The results revealed cases of non-linear correlation between the breathing signal (diaphragm position) and the pancreas motion, and variability of the motion amplitude along the acquisition time and between sessions. This reinforces the need of an alternative method, comparative to the use of external surrogates, for simulation of a 4D dose distribution.

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