Contribution ID: **67** Type: **Oral presentations**

A study on repainting strategies for treating moving targets with proton pencil beam scanning for the new Gantry 2 at PSI

Wednesday 3 February 2010 17:15 (15 minutes)

Treating moving targets using a scanning gantry for proton therapy is a challenging, unexplored and unresolved problem. The interference of organ motion with the sequence of the beam delivery produces uncontrolled dose inhomogeneities within the target. One promising approach to overcome this difficulty is to increase the speed of scanning in order to apply the dose repeatedly (so called repainting). To obtain sufficiently high scanning speeds a new, technologically improved gantry - Gantry 2 - has been designed and is currently under construction at PSI. As there are many possible repainting strategies, the way repainting will be implemented on Gantry 2 will depend on the result of a careful analysis of the various treatment delivery strategies available. To this aim, and prior to the start of experimental work with Gantry 2, simulations of dose distribution errors due to organ motion under various beam delivery strategies were investigated.
In total over 200'000 dose distributions have been simulated and analyzed and selected results are discussed. From the obtained results we are confident to treat moderately moving targets on Gantry 2 using repainted pencil beam spot scanning. Continuous line scanning seems to be the most elegant solution, it provides higher repainting rates and produces superior results but is probably more difficult to realize. For larger motion amplitudes continuous line scanning still shows good results. To further reduce the dose inhomogeneity within the target volume and safety margins, gating or a breath hold technique is planned to be used for larger motion amplitudes.

Please submit a short bio (max 1500 characters)

2001 - 2006 Master of Physics at ETH Zurich
2006 - now PhD Student at PSI/ETHZ at the Center of Proton Therapy (CPT) at PSI

Last Name

Zenklusen

Institution

Paul Scherrer Institute

First Name(s)

Silvan

Telephone

+415603105814

Address

5232 Villigen PSI, Switzerland

E-mail address

silvan.zenklusen@psi.ch

Author: Mr ZENKLUSEN, Silvan (Paul Scherrer Institute, ETH Zurich)

Co-authors: Dr MEER, David (Paul Scherrer Institute); Dr PEDRONI, Eros (Paul Scherrer Institute)

Presenter: Mr ZENKLUSEN, Silvan (Paul Scherrer Institute, ETH Zurich)

Session Classification: Session 4: Novel technologies in radiation therapy

Track Classification: Novel technologies in radiation therapy