Contribution ID : **81** Type : **Oral**

High resolution fibre-optic dosimetry: towards a MRT quality assurance device

Thursday, 22 November 2018 16:15 (15)

Synchrotron microbeam radiation therapy (MRT) is a novel external beam therapy under investigation for its application in the treatment of brain tumours. Key characteristics of these x-ray microbeams is their high flux, high spatial fractionation and large dose rates. For clinical quality assurance, the dose rate in the microbeams (peaks) and between them (valleys) must be measured accurately. We present the progress we have made improving a scintillator fibre optic dosimeter design to be applied to MRT quality assurance. From a one-dimensional spatial resolution initially of 100 μm, we have now achieved microbeam measurements with a 10 μm dosimeter probe. Challenges with these devices include low sensitivity due to the small scintillator volume optically coupled to the fibre optic. The high dose rate of MRT partly overcomes this issue but remains a challenging area with smaller probe sensitive volumes. There is also a 20-30% over-response at low depths when compared to dose readings with ionisation chamber, consistent across all resolution probes tested. The works presented have demonstrated the incremental improvements in the scintillator fibre optic dosimeter and the achievability of its application in MRT. The probe has many desirable qualities, such as water-equivalence, ease of manufacture and relative inexpensiveness compared to other dosimetry devices. We anticipate that this work can lead to a commercial QA dosimetry device in the future.

Primary author(s) : ARCHER, James (University of Wollongong); Dr LI, Enbang (University of Wollongong); DAVIS, Jeremy (University of Wollongong); Dr PETASECCA, Marco (University of Wollongong); HAUSERMANN, Daniel (Australian Synchrotron); HALL, Chris (Australian Synchrotron); LIVINGSTONE, Jayde (Australian Synchrotron); LERCH, Michael (University of Wollongong); Prof. ROSENFELD, Anatoly (University of Wollongong)

Presenter(s) : ARCHER, James (University of Wollongong)

Session Classification : Parallel Session 8

Track Classification : Radiotherapy