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Gas-Jet based Ionization Profile Monitor for Proton FLASH Therapy

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In proton FLASH therapy the beam monitoring is crucial to ensure the conformal dose deposition to the tumour and effective Organ at Risk (OAR) sparing. A non- invasive real time beam monitoring improves the efficacy as the dose is delivered in shorter time scales. To achieve this, gas-jet based Ionization Profile Monitor (IPM) is developed with potential capability towards real time beam monitoring. It detects ions produced by the interaction of primary beam with a thin (<1 mm) gas-curtain without perturbing the beam. This work presents the simulation of IPM to study the ion extraction under different configuration for accurate reconstruction of the beam shape. The role of electric field in the IPM on the trajectory of the ions and the inhomogeneity in their energy distribution affecting the beam profile are studied. The study also investigates the effect of beam misalignment, relative contribution of individual ion states generated due to interaction, and the gas-curtain density distribution. Future work will address configuration required to accommodate broader range of beam relevant to clinical application.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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