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First proof-of-concept transverse beam profile measurements with gas jet in-vivo dose profiler for medical accelerators

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To ensure patient safety, treatment efficacy, and facility efficiency, a full online characterisation of the charged particle beam is required for every ion beam therapy facility. Current dosimetry methods offer limited information or are invasive to the beam, asking for the development of in-vivo dosimetry solutions.

The QUASAR Group, based at Cockcroft Institute in the UK, has been developing non-invasive beam monitor for medical accelerators since 2015. Detailed transverse beam profile monitoring is the first step towards in-vivo dosimetry. The current monitor applies a supersonic beam gas curtain, interacting with a charged particle beam to then exploit the resulting impact ionization to record the transverse beam profile. A prototype monitor was tested at Dalton Cumbrian Facility's pelletron accelerator for proof-of-concept beam measurements in summer 2023. The measurements were carried out for different beam energies, sizes and intensities and with both, proton and carbon ion beams. This contribution presents the monitor design and functioning principle, results from the experimental campaign, and planned upgrades to achieve real-time, non-invasive dosimetry.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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