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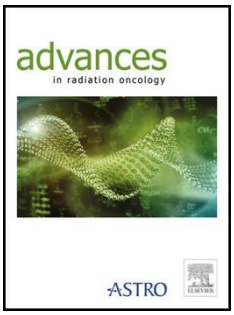

Title: Multiple energy extraction reduces beam delivery time for a synchrotron-based proton spot-scanning system

Author: James E. Younkin, Martin Bues, Terence T. Sio, Wei Liu, Xiaoning Ding, Sameer Keole, Joshua B. Stoker, Jiajian Shen

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Summary

Multiple energy extraction (MEE), a delivery technique now available for Hitachi's synchrotron-based spot-scanning systems, will reduce beam delivery time, but the clinical significance of this reduction is currently unknown. A model validated by both SEE and MEE measurements was used to calculate beam delivery time for a clinic patient cohort of 79 patients. Our results show that MEE reduced total beam delivery time by thirty-five percent, which can be further improved by increasing deliverable charge.

ABSTRACT

Purpose: Multiple energy extraction (MEE) is a technology recently introduced by Hitachi for its spot scanning proton treatment system that allows multiple energies to be delivered in a single synchrotron spill. The purpose of this paper is to investigate by how much beam delivery time (BDT) can be reduced with MEE compared with single energy extraction (SEE) in which one energy is delivered per spill.