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Investigation of pulsed slow extraction schemes at the MedAustron synchrotron

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MedAustron, a synchrotron-based center for ion beam therapy and research located in Wiener Neustadt, Austria, extracts proton and carbon ion beams with third-order resonant slow extraction. In addition to clinical operation, the center hosts a diverse user community for non-clinical research studies, which may require experimental, non-clinical beam parameters. Within this context, different extraction mechanisms are investigated concerning their suitability for delivering the beam not in a continuous spill but rather in a series of short pulses (sub-millisecond to millisecond length) with customizable separation and intensity. Such a beam may offer new opportunities for non-clinical research users, for example, studying the impact of different time structures when delivering beams with FLASH-compatible dose rates.

This contribution explores the suitability of phase displacement and radio frequency knockout extraction for such an application based on Xsuite simulations and measurements. The measurement setup employs a silicon carbide detector in conjunction with a 20MHz bandwidth amplifier, enabling intensity measurements with a resolution exceeding the revolution time.

Footnotes

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