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Slow Extraction Techniques from Fixed Field Accelerators

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Fixed Field Accelerators are a candidate for future hadron cancer therapy facilities as their high repetition rate and large energy acceptance enables novel treatment modalities such as high dose rate FLASH. However, conventional dose delivery mechanisms are still necessary, requiring continuous beam delivery over 1–30s. This work is the first study of slow extraction from a scaling Fixed Field Accelerator, using the LhARA facility for baseline parameters. At a horizontal tune of $10/3$, the intrinsic sextupole strength of the nonlinear FFA magnetic field is sufficient to excite the resonance, although extraction is better controlled using an additional excitation sextupole at a tune close to $8/3$, with radiofrequency knock-out extraction. Including considerations of issues due to nonlinear fields and limitations required to keep the tune energy-independent, slow extraction from Fixed Field Accelerators is successfully demonstrated.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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