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## Conceptual lattice design for vertical fixed field medical accelerators

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Hadron therapy is established as a method of choice for a number of cancerous diseases, and its advantages are well-established for specific malignancies. Modern medical particle accelerators still struggle to fulfil critical features required by advanced treatment modalities, such as variable energy beams, high repetition rate, and pulse-by-pulse intensity modulation. Fixed Field Accelerators (FFAs) are suited to tackle these challenges as they can accelerate particles over a wide energy range with fixed magnetic fields. Vertical orbit excursion FFAs feature constant tunes and a small horizontal footprint, making them excellent candidates for medical applications. We propose a conceptual design of a medical vFFA. Its linear and nonlinear beam dynamics is presented in-depth. This study demonstrates the vFFA potential to provide a new direction for the study and design of medical FFAs suitable for next-generation particle therapy systems.

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### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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