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Gantry design using achromatic scaling fixed-field magnets

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Proton therapy provides significant advantages over classic radiotherapy for specific cancerous diseases, notably by limiting the delivered dose to organs at risk (OARs). Novel treatment modalities such as flash and arc therapy require changing the energy delivered at the isocenter while providing a high dose rate. Fixed-field achromatic transport lattices satisfy both constraints, allowing ultra-fast energy modulation and excellent transmission efficiency while providing a compact footprint. Prior studies [1] have shown that lattices using scaling fixed field magnets allow the achromatic transport of energies between 70 and 230 MeV. We investigate the use of straight scaling FFA line that uses nonlinear fields, fulfilling the straight scaling conditions for achromatic transport, to be used as a matching section for the CASPRO ("Compact Achromatic System for Proton Therapy") project.

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Footnotes

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Yes

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