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A novel large energy acceptance beamline for hadron therapy

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A design study is currently underway at the University of Melbourne for a large energy acceptance beamline to enable future hadron therapy modalities. As part of the TURBO project, a beam delivery system demonstrator is being developed for a DC Pelletron accelerator, which will provide 3 MeV H⁺ beams. Fixed Field Accelerator optics will be used to maximise momentum acceptance, with dispersion minimised at both ends of the transport line. This project aims to be the first 'closed dispersion arc' with fixed fields ever constructed. As part of the design process, the input beam phase space from the Pelletron has been characterised. Our results show that the Pelletron beam can be injected into the novel transport line successfully, and Zgoubi simulations show that near-zero dispersion at each end will be achievable. This is supplemented by error studies and magnet investigations, demonstrating that beam transport can be achieved under realistic circumstances. This initial study establishes the feasibility of this beamline design and work is continuing toward further optimisation for implementation.

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Footnotes

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Yes

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