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Industrial manufacturing of nonlinear field permanent magnets for a constant tune medical FFA

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The FLASH hadron therapy accelerator proposed by Trbojevic requires permanent magnets with nonlinear fields to allow rapid cycling from 10 to 250MeV while keeping the ring tune constant. A test beamline consisting of four cells from this ring is being built at BNL to be tested at the NSRL proton facility. The magnets consist of 24 neodymium-iron-boron (NdFeB) wedges magnetised in different directions and arranged in a complex pattern to produce the desired nonlinear field profile across the oval aperture for the beam movement. Manufacturing of the two distinct types of magnets was bid for by three US companies of which one was selected. This paper details the field quality achieved across the series of magnets, with discussion of the next stage of field shimming or fine-tuning methods required to use them in an accelerator ring.

Footnotes

Paper preparation format

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Region represented

America

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