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Open-midplane gradient permanent magnet with 1.53 T peak field

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The CEBAF energy upgrade will require magnets with high fields to bend electron beams of up to 22GeV in the 80.6m radius tunnel. A peak field in excess of 1.5T, together with a large gradient of 40T/m or more, are used in its fixed-field arc lattice to bend multiple recirculation energies in a single pipe. Additionally, the magnet must have an open midplane to allow synchrotron radiation to be absorbed by a cooling channel.

A short 45mm section of NdFeB prototype has been designed and built as part of permanent magnet R&D at BNL. This satisfies all the above requirements and has had its integrated field tuned to better than 1 part in 10^3 . This tuning process uses a technique with iron rods adapted from CBETA and miniaturised here, together with measurements at a new compact field-mapping stand that is accurate to 1 part in 10^4 .

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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