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Guiding of charged particle beams in curved plasma-discharge capillaries

Thursday 5 June 2025 09:00 (30 minutes)

A new approach that demonstrates the guiding of relativistic electron beams over curved paths by means of a plasma-discharge capillary is presented. The magnetic field produced by the discharge current is used to deflect and focus the beam along a curved capillary, showing that the guiding can be made dispersion-less, i.e. not affected by chromatic dispersion. This proof-of-principle experiment extends the use of plasma-based devices that revolutionised the field of particle accelerators enabling the generation of GeV beams in few centimeters. Compared to state-of-the-art technology based on conventional bending magnets and quadrupole lenses, these results provide a compact and affordable solution for the development of next-generation table-top facilities.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

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