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Commissioning of a fusion collider for interstellar propulsion

Tuesday 12 August 2025 16:00 (2 hours)

A prototype colliding beam accelerator has been fabricated for the study of a fusion-based propulsion concept for interplanetary exploration. The purpose of this prototype is to demonstrate collider luminosities commensurate with the requirements of this application. Direct emission of fusion daughters generates the exhaust velocities required for spacecraft speeds in excess of 1% of the speed of light. Past attempts at nuclear fusion energy production with colliding beams have been limited by Coulomb scattering, a deficiency overcome in this collider architecture. Instead of using fusion fuels such as p/Li7 and He3/He3 capable of generating the required thrust characteristics, this prototype employs deuterons. DD fusion produces neutrons that provide a convenient luminosity detection channel. The commissioning campaign described in this paper operates the collider at a peak beam kinetic energy of 60 keV at the interaction point. Axial confinement and radial focusing are achieved electrostatically. Measured data and subsequent analysis in regard to longitudinal and transverse beam dynamics and beam lifetime are presented.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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