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Physical investigation of a quad confinement plasma source¹ AARON KNOLL, ANDREA LUCCA FABRIS, University of Surrey, CHRISTO-PHER YOUNG, MARK CAPPELLI, Stanford Plasma Physics Laboratory — Quad magnetic confinement plasma sources are novel magnetized DC discharges suitable for applications in a broad range of fields, particularly space propulsion, plasma etching and deposition. These sources contain a square discharge channel with magnetic cusps at the four lateral walls, enhancing plasma confinement and electron residence time inside the device. The magnetic field topology is manipulated using four independent electromagnets on each edge of the channel, tuning the properties of the generated plasma. We characterize the plasma ejected from the quad confinement sources using a combination of traditional electrostatic probes and non-intrusive laser-based diagnostics. Measurements show a strong ion acceleration layer located 8 cm downstream of the exit plane, beyond the extent of the magnetic field. The ion velocity field is investigated with different magnetic configurations, demonstrating how ion trajectories may be manipulated.

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Christopher Young Stanford Plasma Physics Laboratory

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