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Magnetic Detachment and Plume Control in Escaping Magnetized Plasma[1] PAUL SCHMIT, NATHANIEL FISCH, Princeton University, Department of Astrophysical Sciences — The model of two-fluid, axisymmetric, ambipolar magnetized plasma detachment from thruster guide fields is extended to include plasmas with non-zero injection angular velocity profiles. Certain plasma injection angular velocity profiles are shown to narrow the plasma plume, thereby increasing exhaust efficiency. As an example, we consider a magnetic guide field arising from a simple current ring and demonstrate plasma injection schemes that more than double the fraction of useful exhaust aperture area, more than halve the exhaust plume angle, and enhance magnetized plasma detachment.

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