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A parallel finite-volume MHD code for plasma thrusters with an applied magnetic field[1] PETER NORGAARD, EDGAR CHOUEIRI, Electric Propulsion and Plasma Dynamics Laboratory, Princeton University, STEPHEN JARDIN, Princeton Plasma Physics Laboratory — The Princeton Code for Advanced Plasma Propulsion Simulation (PCAPPS) is a recently developed parallel finite volume code that solves the resistive MHD equations in axisymmetric form. It is intended for simulating complex plasma flows, especially those in plasma thrusters. The code uses a flux function to represent the poloidal field. It allows for externally applied magnetic fields, necessary for efficient operation of magnetoplasmadynamic thrusters (MPDT) at low power. Separate electron and heavy species energy equations are employed, and model closure is achieved by a multi-level equilibrium ionization equation of state. We provide results from various validation tests, along with solver accuracy and parallel efficiency studies. Preliminary numerical studies of a lithium-fed MPDT are also presented.

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