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MHD Simulations of Thermal Plasma Jets in Coaxial Plasma Accelerators VIVEK SUBRAMANIAM, LAXMINARAYAN RAJA, The University of Texas at Austin — The development of a magneto-hydrodynamics (MHD) numerical tool to study high energy density thermal plasma in coaxial plasma accelerators is presented. The coaxial plasma accelerator is a device used simulate the conditions created at the confining wall of a thermonuclear fusion reactor during an edge localized mode (ELM) disruption event. This is achieved by creating magnetized thermal plasma in a coaxial volume which is then accelerated by the Lorentz force to form a high velocity plasma jet. The simulation tool developed solves the resistive MHD equation using a finite volume method (FVM) framework. The acceleration and subsequent demagnetization of the plasma as it travels down the length of the accelerator is simulated and shows good agreement with experiments [1]. Additionally, a model to study the thermalization of the plasma at the inlet is being developed in order to give self-consistent initial conditions to the MHD solver.

[1] H Sitaraman and L.L. Raja. Magneto-hydrodynamics simulation Study of deflagration mode in co-axial plasma accelerators. Physics of Plasmas,:012104, 2014

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