Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

Magneto-hydrodynamic simulation of hypervelocity neutral plasma jets and their interactions with materials generating extreme conditions VIVEK SUBRAMANIAM, LAXMINARAYAN RAJA, The University of Texas at Austin, HARISWARAN SITARAMAN, None — The development of a Magneto-hydrodynamics (MHD) numerical tool to study high density thermal plasma in a co-axial plasma gun is presented. The MHD governing equations are numerically solved using a matrix free implicit scheme in an unstructured grid finite volume framework. The MHD model is used to characterize the high energy jet which emanates from the accelerator. The solver is then used to predict the conditions created at the surface of a flat plate placed at a fixed distance from the exit of the gun. The model parameters are adjusted so that the energy density of the jet impacting the plate is of the same order of magnitude as that of the Edge Localized Mode (ELM) disruptions in thermonuclear fusion reactors. The idea is to use the pressure and temperature on the plate surface to obtain an estimate of the stress created on the plate due to jet impact. The model is used to quantify damage caused by ELM disruptions on the confining material surface.

[1] H Sitaraman and L.L Raja. "Magneto-hydrodynamics simulation study of deflagration mode in co-axial plasma accelerators." *Physics of Plasmas,* 21:012104, 2014

Vivek Subramaniam
The University of Texas at Austin

Date submitted: 13 Jun 2014 Electronic form version 1.4