Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Studies of Plasma Instabilities using Unstructured Discontinuous Galerkin Method with the Two-Fluid Plasma Model YANG SONG, BHUVANA SRINIVASAN, Virginia Tech — The discontinuous Galerkin (DG) method has the advantage of resolving shocks and sharp gradients that occur in neutral fluids and plasmas. An unstructured DG code has been developed in this work to study plasma instabilities using the two-fluid plasma model. Unstructured meshes are known to produce small and randomized grid errors compared to traditional structured meshes. Computational tests for Rayleigh-Taylor instabilities in radially-converging flows are performed using the MHD model. Choice of grid geometry is not obvious for simulations of instabilities in these circular configurations. Comparisons of the effects for different grids are made. A 2D magnetic nozzle simulation using the two-fluid plasma model is also performed. A vacuum boundary condition technique is applied to accurately solve the Riemann problem on the edge of the plume.

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Date submitted: 13 Sep 2017 Electronic form version 1.4