1145-65-2039 **Sibusiso Mabuza*** (smabuza@sandia.gov), Sandia National Laboratories, P.O. Box 5800, Albuquerque, NM 87185, and **John N Shadid**, **Eric C Cyr**, **Thomas M Smith** and **Dmitri Kuzmin**. *Stabilized continuous finite element schemes for problems in plasma physics.*

We present finite element schemes for simulating ionized and magnetized gases. We consider iterative, linearity preserving, nodal variation limiting strategies for the stabilization of hyperbolic systems such as the MHD equations and multifluid plasma equations. These equations, are discretized using piece-wise linear continuous finite elements. The stabilization of the scheme follows the flux corrected transport paradigm by introducing some diffusion into the system, whose amount is regulated by solution dependent element and nodal limiters. The limiter is designed to be linearity preserving so to ensure that in smooth regions, second order convergence is observed for smooth solutions. The limiters are also designed such that they continuously dependent on data, guaranteeing solvability of the semi-discrete scheme. We consider a number of standard inviscid and viscous MHD examples in 1D,2D and 3D on unstructured quad and simplex meshes. We also consider two-fluid plasma (ions and electrons) problems. We show the verification and validation of the numerical scheme in this case and applications to very challenging problems. We also demonstrate the robustness of the scheme using various implicit,explicit and IMEX time integrators. (Received September 24, 2018)