Contribution ID: **972** Type: **Poster**

4P59 - Investigating the Electrothermal Instability in Pulsed Power Solid Liner Implosions Using Extended Magnetohydrodynamics

Thursday 27 June 2019 16:00 (1h 30m)

Recent results from experiments of magnetically-driven pulsed power solid liners have exhibited electrothermal instability (ETI) growth early during the phase transitions of the conductor. Understanding the development of these instabilities and potential stabilization mechanisms could play a significant role in the success of fusion concepts such as MagLIF (Magnetized Liner Inertial Fusion). For MagLIF, the magneto Rayleigh-Taylor (MRT)instability is the most detrimental instability toward achieving fusion energy production, so understanding any and all seeding mechanisms can help delay or control the MRT instability growth. The solid liner implosions undergo exotic phase transitions that make ideal magnetohydrodynamics inadequate resulting in the need for more advanced physics models such as extended-MHD. The overall focus of this project is on using a multi-fluid extended-MHD model with kinetic closures for thermal conductivity, resistivity, and viscosity to study moderately-to-highly coupled high energy density plasmas. Thus far extended-MHD simulations have been conducted using SESAME equation-of-state tables along with semi-implicit time-stepping schemes for the parabolic terms of resistivity and thermal conductivity. Simulations of early time ETI growth will be presented using tabulated Lee-More-Desjarlais electrical and thermal conductivities in various configurations and for different pulse profiles.

Author: MASTI, Robert

Co-authors: Dr SRINIVASAN, Bhuvana (Virginia Tech); Dr KING, Jacob (Tech-X Corporation); Dr STOLTZ, Peter (Tech-X Coporation); Mr HANSEN, David (Utah State University); Dr HELD, Eric (Utah State University)

Presenters: MASTI, Robert; Dr SRINIVASAN, Bhuvana (Virginia Tech)

Session Classification: Poster - Charged Particle Beams and Accelerators and High Energy Density Plasmas and Applications

Track Classification: 4.6 Fast Z Pinches