Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Study of axisymmetric Z-pinch compression using continuum kinetic simulations G.V. VOGMAN, University of California - Berkeley, P. COLELLA, Lawrence Berkeley National Laboratory, U. SHUMLAK, University of Washington — Plasma kinetic theory treats each constituent species as a probability distribution function in phase space. Numerically, the velocity dependence of the distribution function can be sampled discretely as in particle-in-cell methods, or represented smoothly as in continuum methods. Continuum methods for solving kinetic theory governing equations are advantageous in that they can be cast in conservation-law form, are not susceptible to noise, and can be implemented using high-order numerical methods, which provide enhanced solution accuracy. A conservative fourth-order finite-volume algorithm has been developed to solve the Vlasov-Maxwell equation system in cylindrical phase space coordinates. This new platform is used to investigate the kinetic physics associated with compression in a collisionless axisymmetric Z-pinch. These kinetic simulations provide a means to assess the accuracy of the polytropic assumptions often made when analyzing Z-pinch stability and scaling properties.

Genia Vogman
UC Berkeley

Date submitted: 15 Jul 2016 Electronic form version 1.4