Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Electrostatic gyrokinetic simulations of m=0 mode in sheared flow Z-pinch plasmas[1] V. I. GEYKO, M. DORF, J. R. ANGUS, Lawrence Livermore Natl Lab — Stability properties of axisymmetric sheared flow Z-pinch plasmas are studied by making use of the gyrokinetic approximation in the long-wavelength limit. Numerical simulations are performed by the high-order finite-volume electrostatic code COGENT for the parameters characteristic of the FuZE experiment. Linear growth rate of the axisymmetric m=0 sausage mode is found as a function of wave number k_z for different values of shear flow velocity. The reduction of the growth rate and stabilization of high-k modes by the sheared flow are observed. The results are elucidated by making use of a local dispersion relation analysis, and the importance of finite Larmor radius effects is shown. In addition, the results are compared to ones provided by ideal MHD models and fully kinetic PIC simulations. A good agreement with PIC results is demonstrated, in particular, for high-k part of the spectra where ideal MHD models are unable to produce adequate mode description.

[1]Prepared by LLNL for USDOE SC-FES under Contract DE-AC52-07NA27344, LLNL LDRD project 18-ERD-007.

V. I. Geyko
Lawrence Livermore Natl Lab

Date submitted: 03 Jul 2019 Electronic form version 1.4