Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

**Ten-Moment Multifluid and Vlasov-Maxwell Modeling of Kelvin-Helmholtz Instability**[1] LIANG WANG, SILVIO SERGIOI CERRI, CHUANFE DONG, Princeton University, AMMAR HAKIM, Princeton Plasma Physics Laboratory — Anisotropic and non-gyrotropic particle distribution functions are often identified in collisionless plasmas, particularly when there is a sheared background flow and induced Kelvin-Helmholtz Instability (KHI). The dynamic evolution of KHI influenced by such effects was studied in an extended MHD model with the gyrotropic components evolved in time while the non-gyrotropic components determined from analytic formulas. In this work, we present results using the ten-moment model that evolves both gyrotropic and non-gyrotropic pressure components self-consistently. Every species, including electrons, and evolved using their density, momentum, and energy equations. Non-ideal effects like electron inertia and Hall term are naturally contained in these equations. We will first compare the ten-moment simulation results with the so-called five-moment model that retains only an isotropic, gyrotropic scalar pressure for each species. This way we identify the effects introduced by the FLR effects. We will then compare the ten-moment results with those from fully kinetic Vlasov-Maxwell simulations. This serves to further understand the importance of FLR effects and the role of heat flux. All simulations are performed within the PPPL computational plasma physics framework, Gkeyll.

[1]Air Force Office of Scientific Research Grant No. FA9550-15-1-0193

Liang Wang
Princeton University

Date submitted: 08 Jul 2019 Electronic form version 1.4