Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

**Maximum-entropy 14 moments description of non-equilibrium electrons in crossed electric and magnetic fields** STEFANO BOCCELLI, Politecnico di Milano; von Karman Institute for Fluid Dynamics., PIETRO PARODI, von Karman Institute for Fluid Dynamics, LORENZO VALLISA, von Karman Institute for Fluid Dynamics; MOX, Politecnico di Milano, WILLEM KAUFMANN, University of Ottawa, PAOLO BARBANTE, Politecnico di Milano, JAMES G. MCDONALD, University of Ottawa, THIERRY E. MAGIN, von Karman Institute for Fluid Dynamics — Low-pressure plasma discharges in presence of crossed electric and magnetic fields often show strong translational non-equilibrium. This limits the validity of fluid and hybrid fluid-kinetic descriptions and leads to the incorrect prediction of transport processes. Extended fluid-like descriptions based on higher-order moments promise to offer enhanced physical accuracy over commonly employed 5-moments formulations. We investigate a 14 moments maximum entropy formulation for the description of electrons colliding with a neutrals background. The proposed description embeds pressure anisotropy, characteristic of magnetized plasmas, and includes additional non-equilibrium features such as the possibility to reproduce Druyvensteyn and ring-like velocity distributions. We compare the solution of the 14 moments system to Particle-In-Cell simulations for operating conditions characteristic of Hall thruster discharges. A solution of a 5-moments system is provided as a baseline comparison. The 14 moments system shows able to accurately predict electrons transport both in steady and unsteady conditions, reproducing accurately the non-Maxwellian distribution function. The solution is more computationally expensive than the 5 moments system, but much cheaper than a kinetic solution.

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Date submitted: 25 May 2020 Electronic form version 1.4