Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Instabilities in fluid simulations of ExB plasmas GERJAN HAGELAAR, SARAH SADOUNI, LAPLACE, CNRS and University of Toulouse — The operation of magnetized low-temperature plasma devices such as Hall thrusters and magnetrons involves various types of plasma instabilities, generally causing anomalous electron transport across the magnetic field lines. This paper demonstrates that fluid models of these plasma devices, when solved properly in the 2D plane perpendicular to the magnetic field lines, intrinsically produce some of such plasma instabilities and anomalous transport, whose behavior may or may not be realistic, depending on the configuration and conditions. Results are shown from a self-consistent fluid code developed at LAPLACE based on standard fluid equations for continuity, momentum and energy of (partially) magnetized electrons and ions, for different simple ExB plasma configurations. These results are compared with PIC simulations, checked against a linear instability analysis and interpreted in terms of basic instability types known in the literature.

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Date submitted: 19 Jul 2017 Electronic form version 1.4