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Fluid modeling and linear analysis of instabilities in ExB discharge plasmas in Hall Thrusters SARAH SADOUNI, GERJAN HAGELAAR, LAPLACE, CNRS and University of Toulouse, ANDREI SMOLYAKOV, University of Saskatchewan — ExB discharge plasmas, present in devices such as Hall thrusters, show the emergence and growth of instabilities, subject of our study. The LAPLACE laboratory in Toulouse elaborated its own self-consistent fluid code called MAGNIS, previously used for the study of transport phenomena occurring in the negative ion source for ITER. This 2D code considers the plane perpendicular to the magnetic field for its simulations, and can describe the ExB plasma configuration. The aim is to compare the instabilities described by MAGNIS to the results of an analytical linear analysis : measured growth rate, frequency and wave numbers compared to those given by elementary dispersion relations characteristic of reference instabilities in literature that are likely to develop in the Hall thruster configuration. Through this analysis we are able to verify the relevance and the numerical capabilities of the MAGNIS code to describe the instabilities in a Hall thruster and better understand their behavior over a wide range of parameters and their effects.

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