

Abstract Submitted
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Stochastic webs formation and anomalous chaotic cross-field particle transport in Hall-thruster by ExB electron drift instability DEBRAJ MANDAL, Institute for Plasma Research, Gandhinagar 382428, India, YVES ELSKENS, Aix-Marseille Universit, CNRS, UMR 7345-PIIM, France, XAVIER LEONCINI, Aix-Marseille Univ, Universit de Toulon, CNRS, CPT, Marseille, France, NICOLAS LEMOINE, Universit de Lorraine, Institut Jean Lamour, UMR 7198, CNRS, France, FABRICE DOVEIL, Aix-Marseille Universit, CNRS, UMR 7345-PIIM, France, DEVENDRA SHARMA, Institute for Plasma Research, Gandhinagar 382428, India — The ExB electron drift instability is, observed in many magnetized plasma devices, an important agent in crossfield particle transport. The collisionless electron transport mechanism is analyse, due to presence of a single electrostatic mode generated from this instability, by considering a reduced two-degrees-of-freedom Hamiltonian. It helps to simplify the original dynamics complexity. In the presence of this electrostatic wave the magnetized charged particle dynamics becomes chaotic, and for different parameter values it generates Halloween-mask like and other different stochastic webs in the phase-space. A scaling exponent is defined to characterise transport in such phase-space, and find anomalous transport, of super-diffusive type. The trajectories stick to different kinds of islands in phase space, and their different sticking time power-law statistics generate successive regimes of the super-diffusive transport. In the next part we are intending to generate the ExB drift instability self-consistently, in Hall-thruster geometry using a 2D PIC-MCC simulation, and compare the crossfield transport coefficient value with that coming from the simplified model.

Debraj Mandal
Inst for Plasm Res

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