Abstract Submitted
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Kinetic simulations of plasma sheath with parallel to the wall magnetic field[1] NATALIA KRASHENINNIKOVA, XIANZHU TANG, LANL — Plasma-wall interactions can play an important role in plasma transport and confinement in tokamaks or Magneto-Inertial Fusion (MIF), where one of the approaches is to use an imploding metal liner to compress magnetized target plasma to thermonuclear temperatures. Since for the MIF applications the magnetic field is parallel to the liner surface, the ions, with their large gyro-radii, positively charge the wall. This creates a strong ExB shear flow which can cause turbulence and influence transport. Here we report on progress of the simulation studies of plasma sheath turbulence using a state-of-the-art VPIC [1] code. Baseline calculations have confirmed the possibility of establishing a quiescent plasma sheath in 1D for a flat liner surface[2,3]. However, in higher dimensions, these self-consistent plasma and field parameters do not always result in a stable sheath. In this work we present the analysis of a 2D equilibrium and quantify its stability characteristics for two cases, with Debye length being intermediate between electron and ion thermal Larmors and Debye length being much smaller than electron Larmor. [1] K. J. Bowers, et al. Phys. Plasmas 15, 055703 (2008). [2] N. Krasheninnikova, et al. Phys. Plasmas 17 057103 (2010). [3] N. Krasheninnikova, et al. Phys. Plasmas 17 063508 (2010).

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