Abstract Submitted
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Computational and experimental studies of plasma stratification in noble gases and nitrogen[1] VLADIMIR KOLOBOV, University of Alabama in Huntsville, MALIK TAHIYAT, TANVIR FAROUK, University of South Carolina, GABE XU, University of Alabama in Huntsville — Recent advances of computational tools allow simulations of plasma stratification in atomic and molecular gases. Moving striations in diffuse and constricted DC discharges and standing striations in Capacitively Coupled Plasma in argon have been reproduced in computer simulations [1,2]. It was confirmed that these striations appear due to non-linear dependence of the ionization rate on electron density caused by EEDF Maxwellization via Coulomb collisions. In the present paper, we will report progress towards simulations of other types of striations in noble gases and plasma stratification in nitrogen gas. A Fokker-Planck kinetic solver for electrons is used to simulate moving striations in DC discharges of noble gases associated with non-local electron kinetics. A fluid plasma model taking into account vibrationally excited states of molecules is used to simulate standing striations in DC discharges of nitrogen. Experimental studies are conducted to guide the computational work and validate the developed models. [1] R. R. Arslanbekov and V I. Kolobov, Advances in simulations of moving striations in DC discharges of noble gases, Phys. Plasmas 26, 104501 (2019) [2] V. I. Kolobov, R. R. Arslanbekov, D. Levko and V. A. Godyak, Plasma stratification in radio-frequency discharges in argon gas, J. Phys. D: Appl. Phys. 53 (2020) 25LT01

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