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Effects of the cathode electron emission on transient phenomena in magnetized thruster discharge[1] YEVGENY RAITSES, JEFFREY B. PARKER, NATHANIEL J. FISCH, Princeton Plasma Physics Laboratory — Large-amplitude, low-frequency, discharge current oscillations invariably occur in the Hall thruster discharge. This discharges are characterized by magnetized electrons and unmagnetized ions. The oscillations are thought to result from various ionization mechanisms [1]. A rotating potential perturbation, called a spoke, is observed to propagate in the E $\times$ B direction for certain magnetic field topologies of the thruster discharge, including both cylindrical and annular configurations [2, 3]. We show that increasing the cathode electron emission curiously suppresses both the rotating spoke and the low frequency oscillations. This effect correlates with a change in the local V-I characteristics of the plasma discharge. In particular, in the regime with the enhanced electron emission, there are no plasma regions with negative differential resistance, which are normally observed for the self-sustained operation of the thruster discharge. [1] S. Barral and E. Ahedo, Phys. Rev. E **79**, 046401 (2009). [2] G. S. Janes and R. S. Lowder, Phys. Fluids **9**, 1115 (1966). [3] Y. Raitses, A. Smirnov and N. J. Fisch, Phys. Plasmas **16**, 057106 (2009).

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