EFFECTS OF THE CATHODE ELECTRON EMISSION AND BACKGROUND GAS PRESSURE ON TRANSIENT PHENOMENA IN MAGNETIZED THRUSTER DISCHARGE*

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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,[2] is observed to propagate in the E×B direction for certain magnetic field topologies of the thruster discharge, including both cylindrical and annular configurations. We show that increasing the cathode electron emission[3] or increasing the background pressure curiously suppresses both the rotating spoke and the low frequency oscillations. These effects correlate with the reduction of the electron cross-field transport in the thruster discharge. Possible physical mechanisms responsible for these effects are discussed.

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