

Abstract Submitted
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Passive optical diagnostic of electric propulsion Xe plasmas: the role of metastable atoms¹ RAINER A. DRESSLER, YU-HUI CHIU, Air Force Research Laboratory, Space Vehicles Directorate, Hanscom AFB, MA 01731, LALITA SHARMA, RAJESH SRIVASTAVA, Department of Physics, Indian Institute of Technology, Roorkee - 247667, India, GEORGE F. KARABADZHAK, TSNIMASH, Korolev, Moscow region, 141070, Russia — Metastable Xe atoms play an important role in the radiation of xenon propelled electric thrusters. Experimental and theoretical cross sections for electron-excitation from the $5p^56s$ $J=2$ metastable level ($1s_5$ state in Paschen notation) to the lowest six $5p^56p$ ($2p$) levels have recently become available, thereby providing important rate coefficients for the depopulation of the $1s_5$ state. Application of a collisional radiative model to near-infrared spectral intensities observed in the plume of a Hall thruster, however, demonstrates that additional depopulation paths are important. Present calculations show that the electron-induced excitation to $5p^56s$ $J=1$ ($1s_4$) and other $5p^56s$ levels, for which newly calculated cross sections are presented, can account for the additional de-excitation mechanisms in plasma regions with low electron temperatures.

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