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Modeling of extreme ultraviolet emissions of molecular nitrogen induced by nonthermal gas discharges in air with application to photoionization and photodetachment processes in the Earth's lower ionosphere REZA JANALIZADEH, VICTOR P PASKO, Pennsylvania State University — Modeling the extreme ultraviolet (EUV) emissions of molecular nitrogen, N_2, induced by nonthermal gas discharges in air is yet an unsolved problem [Janalizadeh and Pasko, *Plasma Sources Sci. Technol.*, 28(10), 105006, 2019]. These emissions cause photoionization of molecular oxygen, O_2, which significantly impacts streamer dynamics in air [e.g., Liu et al., *J. Geophys. Res.*, 109, A04301, 2004]. Recently, Janalizadeh and Pasko [*J. Phys. B*, doi: 10.1088/1361-6455/ab76e6, 2020] modeled the intense ($v' = 0, v'' = 0$) emission band of the N_2 Carroll-Yoshino band system (i.e., $c_4'^1\Sigma_u^+ \rightarrow X^1\Sigma_g^+$) due to nonthermal gas discharges. Here, we expand our framework to include $^1\Pi_u \rightarrow {}^1\Sigma_g^+$ transitions, which along with $^1\Sigma_u^+ \rightarrow {}^1\Sigma_g^+$ transitions govern the EUV spectrum of N_2. In particular, we consider the N_2 Birge-Hopfield I band system with emissions observed in the Earths dayglow and aurora [R. R. Meier, *Space Sci. Rev.*, 58, 1-185, 1991]. In conclusion, the framework is discussed in relation to sources other than solar radiation, which may contribute to photoionization and photodetachment processes in the lower ionosphere.

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