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Non-monotonous excitation profiles in positive column of DC nitrogen discharge due to the electron distribution non-locality EUGENE BOGDANOV, ANATOLY KUDRYAVTSEV, SEMEN POPUGAEV, St. Petersburg State University, LEV TSENDIN, St. Petersburg State Polytechnic University — Because of the presence of very different energy scales caused by elastic collisions, excitation of vibrational and electronic states, the nonlocal character of the electron distribution function (EDF) manifests itself in various ways in its different parts. As different parts of EDF have different electron energy relaxation lengths, surprising phenomena were revealed in [L. D. Tsendin, E. A. Bogdanov, A. A. Kudryavtsev. Phys. Rev. Lett., v.94, 015001, 2005] for DC positive column (PC) plasmas in atomic gases: the peaks of the profiles of the excitation rates shift from the discharge axis toward the periphery as the pressure increases. In this report we present the results of kinetic simulations of PC in molecular nitrogen in different pressures and analyze radial distributions of plasma parameters for different conditions. We have found that non-monotonic distributions exist not only for electronic states, but also for vibrational levels. The work was supported by the RFBR grant N 06-02-17317.

Anatoly Kudryavtsev
St. Petersburg State University

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