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Non-local effects in spatial distribution of excitation rates in positive column of glow discharge plasma of molecular gases[1] ANATOLY KUDRYAVTSEV, EUGENE BOGDANOV, LEV TSENDIN, St. Petersburg State University — At simulations of gas-discharge plasmas the electron distribution function (EDF) is usually calculated using a local approximation (LA) which is applicable only when electron energy relaxation length $le <$ $R - -$plasma size. For atomic gases $le >$ $100l$ (l – electron free-path-length), so the LA for EDF is not valid up to high pressures. By contrast, in molecular gases due to strong vibrational excitation with low energy threshold, the length le is small $le \sim l$. And so it is assumed everywhere that the LA for EDF calculation in molecular gases is valid in any cases when diffusive approximation $R¿l$ is applicable. In this report it is shown that in molecular gases local approximation is inapplicable on the discharge periphery, where ambipolar field exceeds longitudinal field. A heating of fast electrons in ambipolar field gives rise to excitation constants from centre to periphery of discharge.

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