EXCITATION-DEEXCITATION OF N_2^+ ($B^2\Sigma_u^+$, v = 0) ROTATIONAL STATES IN A DIFFUSE PLASMA

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While sharply different rotational temperature for the lower and higher rotational states of H_2 have been observed in astrophysical situations, studies on heavier molecules are less encountered. We report here results of plasma spectroscopic studies on the nitrogen system where the FNS bands (0,0) and (0,1) show much distinctive 'two-temperature' phenomena, the departure from the high rotational temperature part (840 ± 50°K and 920 ± 30°K respectively) being perceptible at $N'(N' + 1) \cong 160$. The experimental system is an electron beam sustained magnetoplasma at 5×10^{-3} torr, with $kT_e \cong 1.5$ eV and $n_e \cong 4 \times 10^{10}$ cm^{-3} obtained from in situ measurements of plasma parameters. Relative excitation-deexcitation rates of the N_2^+ $B^2\Sigma_u^+$ rotational states and also in relation to those of H_2 are discussed.

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