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Spatial and time evolution of $N_2(C)$, $N_2(B)$ and N in atmospheric nitrogen plasma created by nanosecond repetitively pulsed discharges
ARNAUD GALLANT, CentraleSuplec — Atomic nitrogen sources are essential for nitridation processes and for other applications such as nanomaterial synthesis or biomedical engineering. Nitrogen plasmas produced by nanosecond repetitively pulsed (NRP) discharges at pressures above atmospheric are considered as a potential source of atomic nitrogen owing to their high energy efficiency and atomic yield. In the present work, we are operating in pure molecular nitrogen at atmospheric pressure. We have measured during the first nanoseconds of the discharge down to 100 ns in the postdischarge, the density of $N_2(C)$, $N_2(B)$ using absolutely calibrated 2D optical emission spectroscopy. The density of ground state N is deduced from the density of $N_2(B)$ whose certain vibrational states (here $v=11$) are in partial kinetic equilibrium with the ground state of N .

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