Abstract Submitted
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Distinctive features of kinetics of plasma at high specific energy deposition NIKITA LEPIKHIN, Ecole Polytechnique, France, NIKOLAY POPOV, Skobeltsyn Institute of Nuclear Physics (MSU), Russia, SVETLANA STARIKOVSKAIA, Ecole Polytechnique, France — A nanosecond capillary discharge in pure nitrogen at moderate pressures is used as an experimental tool for plasma kinetics studies at conditions of high specific deposited energy up to 1 eV/molecule. Experimental observations based on electrical (back current shunts, capacitive probe) and spectroscopic measurements (quenching rates; translational, rotational and vibrational temperature measurements) demonstrate that high specific deposited energy, at electric fields of 200-300 Td, can significantly change gas kinetics in the discharge and in the afterglow. The numerical calculations in 1D axially symmetric geometry using experimental data as input parameters show that changes in the plasma kinetics are caused by extremely high excitation degree: up to 10% of molecular nitrogen is electronically excited at present conditions. Distinctive features of kinetics of plasma at high specific energy deposition as well as details of the experimental technique and numerical calculations will be present. The work was partially supported by French National Agency, ANR (PLASMAFLAME Project, 2011 BS09 025 01), AOARD AFOSR, FA2386-13-1-4064 grant (Program Officer Prof. Chiping Li), LabEx Plas@Par and Linked International Laboratory LIA KaPPA (France-Russia).

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