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Laser flash-photolysis and gas discharge in N2O-containing mixture: kinetic mechanism ILYA KOSAREV, NIKOLAY POPOV, SVETLANA STARIKOVSKAIA, ANDREY STARIKOVSKIY, MIPT TEAM — The paper is devoted to further experimental and theoretical analysis of ignition by ArF laser flash-photolysis and nanosecond discharge in N2O-containing mixture has been done. Additional experiments have been made to assure that laser emission is distributed uniformly throughout the cross-section. The series of experiments was proposed and carried out to check validity of $O(^1D)$ determination in experiments on plasma assisted ignition initiated by flash-photolysis. In these experiments, ozone density in the given mixture (mixture composition and kinetics has been preliminary analyzed) was measured using UV light absorption in Hartley band. Good coincidence between experimental data and results of calculations have been obtained Temporal behavior of energy input, electric field and electric current has been measured and analyzed. These data are considered as initial conditions for numerical modeling of the discharge in O2:N2O:H2:Ar = 0.3:1:3:5 mixture. Ion-molecular reactions and reactions of active species production in Ar:H2:O2:N2O mixture were analyzed. The set of reactions to describe chemical transformation in the system due to the discharge action has been selected.

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