

Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

Fast Nonequilibrium Plasma Thermalization in N₂-O₂ Mixtures at Different Pressures MARYIA NUDNOVA, SVETLANA KINDUSHEVA, NIKOLAY ALEKSANDROV, ANDREY STARIKOVSKIY, Princeton University, NEQLAB TEAM — Observations of a shock wave propagating through a decaying plasma in the afterglow of an impulse high-voltage nanosecond discharge and of a surface dielectric barrier discharge in the nanosecond range were analyzed to determine the electron power transferred into heat in air plasmas in high electric fields. It was shown that approximately half of the discharge power can go to heat for a short ($\sim 1 \mu\text{s}$ at atmospheric pressure) period of time when reduced electric fields are present at approximately 10^3 Td. A kinetic model was developed to describe the processes that contribute towards the fast transfer of electron energy into thermal energy under the conditions considered. Calculations based on the developed model agree qualitatively with analyses of high-voltage nanosecond discharge observations. Different gas pressures and N₂-O₂ mixture compositions were investigated.

Andrey Starikovskiy

Date submitted: 21 Jul 2011

Electronic form version 1.4