

Abstract Submitted
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NO density and gas temperature measurements in atmospheric pressure nanosecond repetitively pulsed (NRP) discharges by Mid-IR QCLAS¹ MARIEN SIMENI SIMENI, GABI-DANIEL STANCU, CHRISTOPHE LAUX, Laboratory EM2C, Ecole Centrale Paris — Nitric oxide is a key species for many processes: in combustion, in human skin physiology... Recently, NO-ground state absolute density measurements produced by atmospheric pressure NRP discharges were carried out in air as a function of the discharge parameters, using Quantum Cascade Laser Absorption Spectroscopy. These measurements were space averaged and performed in the post-discharge region in a large gas volume. Here we present radial profiles of NO density and temperature measured directly in the discharge for different configurations. Small plasma volume and species densities, high temperature and EM noise environment make the absorption diagnostic challenging. For this purpose the QCLAS sensitivity was improved using a two-detector system. We conducted lateral absorbance measurements with a spatial resolution of $300\mu\text{m}$ for two absorption features at 1900.076 and 1900.517 cm^{-1} . The radial temperature and NO density distributions were obtained from the Abel inverted lateral measurements. Time averaged NO densities of about $1.E16\text{ cm}^{-3}$ and gas temperature of about 1000K were obtained in the center of the discharge.

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