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Time-resolved TALIF measurements of temperature and CO number density in an NRP discharge JEAN MAILLARD, ERWAN PANNIER, CHRISTOPHE LAUX, Laboratoire EM2C, CentraleSupelec, CNRS, Universite Paris-Saclay — Time-resolved measurements of temperature and CO density are performed in the afterglow of Nanosecond Repetitively Pulsed (NRP) discharges in pure CO2 at atmospheric pressure and room temperature. We use Two-photon Absorption Laser-Induced Fluorescence (TALIF) in the first ten microseconds after the pulse. CO is excited with a 230 nm laser beam. An excitation spectrum is recorded with a camera and fitted to yield the rotational temperature and the CO density in the discharge. Preliminary measurements at 1-10 μs after the pulse have been carried out. Additional measurements within the first microsecond following the pulse are on-going. For these measurements, a second camera is triggered just before the laser pulse to measure the plasma emission. This new set-up allows a better subtraction of the plasma emission. It also enables to monitor the perturbations induced by the laser. A temperature of 1700 K is measured at the center of the discharge, which is consistent with the 2000 K measured in a previous study by infrared emission spectroscopy in the same discharge. At t = 1 μs after the pulse, we report 16% CO2 dissociation.

Jean Maillard
Laboratoire EM2C, CentraleSupelec, CNRS, Universite Paris-Saclay

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