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**Temperature and energy evolution of nanosecond repetitively pulsed discharges in air at atmospheric pressure** FARAH KADDOURI, DAVID Z. PAI, GABI D. STANCU, DEANNA A. LACOSTE, CHRISTOPHE O. LAUX, Ecole Centrale Paris, EM2C TEAM — Nanosecond repetitively pulsed (NRP) discharges have been widely studied this last decade for different applications: plasma assisted combustion, bio-medecine and aerodynamic flow control. We are interested in the effect of NRP discharges on combustion, namely on the mechanism of stabilization of lean premixed flames. NRP discharges were generated in a pin to pin configuration at atmospheric pressure in preheated air at 1000 K by high voltage (6.3 kV) pulses of 10-ns duration applied at a repetition frequency of 10 kHz. Our interest was to focus on the impact of the excited nitrogen densities on the heat release. Gas temperature (Tg) measurements have been performed. We compared this temperature profile to the one obtained by calculations. In these calculations we also evaluate the contribution of each excited nitrogen state to the increase of the gas temperature. We obtain good agreement between the measurements, which show a very fast increase of Tg from 1500K to 2800 K in 10 ns, and the calculations. N2 (B) is shown to have the major contribution (about 85%) to this fast heating process.

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