Abstract Submitted
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Simulation of the ignition by a nanosecond spark discharge of a H_2-air mixture at atmospheric pressure[1] ANNE BOURDON, FABIEN THOLIN, DEANNA LACOSTE, EM2C laboratory, Ecole Centrale Paris, France, NON-EQUILIBRIUM PLASMA GROUP TEAM — Since a few years, Nanosecond repetitively Pulsed Discharges (NRPD) have been extensively studied at atmospheric pressure as they efficiently produce many reactive chemical species at a low energy cost. Recent measurements have shown that in the "spark" regime of NRP discharges, an ultra-fast local heating of the gas could be obtained. This effect is of great interest for applications as flow control and plasma assisted combustion. In this work, we have carried out 2D simulations of the coupling of a nanosecond spark discharge in air at atmospheric pressure in a point-point geometry with the ambient air. In particular, we have simulated shock waves generated by a nanosecond spark discharge and we have compared our results with experiments. Then, we have studied the production of active species by a nanosecond spark discharge. Finally, we have simulated the flame ignition in a lean H_2-air mixture by a nanosecond spark discharge. Based on the results obtained at different gas temperatures, the relative importance for the combustion ignition of gas heating and production of active species by the nanosecond spark discharge is discussed.

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