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Study of the maximum length of atmospheric pressure microplasma jets ANNE BOURDON, FRANCOIS PECHEREAU, JAROSLAV JANSKY, laboratory EM2C, Ecole Centrale Paris, France — Since a few years, atmospheric pressure microplasma jets formed by pulsed helium discharges ignited in thin dielectric tubes have received considerable interest due to their potential for biomedical applications. At the tube exit, in most experimental set-ups, the maximum length of the microplasma jet is related to the helium-air mixing. Indeed, the discharge front is usually tubular at the tube exit and its radius decreases during its propagation, as the discharge is constrained to propagate in the region with a sufficient helium concentration. However, when a voltage pulse with a short decrease time is used in experiments, the maximum length is related to the voltage decrease with a decrease of the emission of the discharge front. As the discharge front stops propagating, an increase of emission is observed in the tube. In this work, we propose to simulate in 2D the discharge dynamics and to study the influence of the voltage decrease time on the maximum length and discharge structure of a microplasma jet. Results will be compared with experiments. Finally, we propose to simulate in 2D the interaction of two counter propagating microplasma jets to study the influence of the polarity of discharges and of the dielectric tube radius on the length of both plasma jets.

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