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Dynamics and structure of helium discharge in thin dielectric tubes at atmospheric pressure JAROSLAV JANSKY, ANNE BOURDON, Laboratory EM2C, Ecole Centrale Paris, Grande voie des vignes, 92295 Chatenay-Malabry, France — Since a few years, atmospheric pressure plasma micro-jets formed by pulsed helium discharges ignited in thin dielectric tubes have received considerable interest due to their potential for biomedical applications. So far, most experimental and simulation works have been dedicated to the study of the plasma plume. Recently, to better understand the ignition and dynamics of plasma jets, different experiments have been done to study the discharge inside tubes and close to the tube exit. In this work, we propose to simulate in 2D the discharge ignition and dynamics inside the tube. In particular we propose to discuss the influence of the electrode geometry and of nitrogen admixtures and to compare simulation results with recent experiments done by different research groups. In this work, the dynamics of surface charge deposition during the discharge propagation in the tube is studied. For repetitive voltage pulses, we propose to discuss the influence of some remaining surface charges from previous discharges on the subsequent discharge ignition. Finally, we propose to simulate the interaction of two discharges propagating towards each other in tubes and to compare results with experiments.

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