Abstract Submitted
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Parametric calculations of plasma jets generated by microdischarges[1] M. FOLETTO, Univ Toulouse, J.P. BOEUF, L.C. PITCHFORD, CNRS and Univ Toulouse — "Guided streamers" or "plasma jets" can be generated in open air by applying rf or impulse voltages to a microdischarge through which there is a flow of helium. For flow conditions such that a helium column surrounded by air extends some distance (centimeters) past the exit of the microdischarge, a plasma jet can be initiated. Previous works have shown that this is essentially a streamer propagating in the easily-ionized helium column and impeded from branching by the surrounding air. For many applications, it is of interest to understand the parameters controlling the properties of the plasma jet. To this end, we present results from a series of parametric calculations using our previously published model [1] to identify the influence of the microdischarge configuration on the generation, propagation, and properties of the plasma jet. We focus mainly on a geometry with hollow, concentric electrodes separated by a dielectric tube corresponding to the experiments of Douat et al [2], and we vary the dimensions and relative off-set of the electrodes, applying an impulse voltage or the experimental waveform to the inner electrode. For the same applied voltage waveform, parameters which influence the electric field and electron density in the plasma jet are the dielectric permittivity, the tube diameter, and the dielectric length.

[1] JP Boeuf, et al, J. Phys. D: Appl. Phys. (2013) 46 015201.
[2] C. Douat et al, Plasma Sources Sci. Technol. (2012) 21, 034010.

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