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Influence of electrode positions and gas flow on the onset and propagation of an atmospheric pressure plasma jet CLAIRE DOUAT, GERARD BAUVILLE, MICHEL FLEURY, VINCENT PUECH, Laboratoire de Physique des Gaz et des plasmas - CNRS and Univ. Paris Sud, Orsay, France
— Plasma jets produced in noble gases by pulsed discharges and propagating in surrounding air have recently attracted a lot of attention due to their physical properties enabling the development of new applications, such as plasma medicine. Our device consisted of a quartz tube with inner and outer diameters equal to 2mm and 4mm, respectively. Helium was flowing through the inner electrode connected to a pulsed high voltage, while a grounded copper electrode was wrapped around the tube. Helium flow was in the range from 1 to 6 slm. The plasma jet propagated inside grounded metallic tubes of different diameters, allowed to study the influence of the location of the external potential on the propagation of the plasma. It will be shown that the discharge breakdown voltage, the onset of a plasma jet, its length of propagation and the velocity of the ionization front are sensitive function of the electrode arrangement, of the location of the reference potential and of the gas flow. All these parameters interplayed in a complex manner. It will be shown how minor changes in the overall configuration can induce dramatic effects on the properties of the plasma jet.

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