

Abstract Submitted  
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**Transfer of Atmospheric Pressure Plasma Streams Across Dielectric Tubes and Channels**<sup>1</sup> ZHONGMIN XIONG, University of Michigan, ERIC ROBERT, VANESSA SARRON, JEAN-MICHEL POUVESLE, GREMI/CNRS-Univ. Orleans, MARK J. KUSHNER, University of Michigan — Transfer of atmospheric pressure plasma streams refers to the production of an ionization wave (IW) in a tube or channel by impingement of a separately produced IW onto its outer surface. In this paper, we report on a joint numerical and experimental investigation of this plasma transfer phenomenon. The two tubes, source and transfer, are perpendicular to each other in ambient air with a 4 mm separation. Both are flushed with Ne. The primary IW is generated in the source tube by ns to  $\mu$ s pulses of  $\pm 25$  kV, while the transfer tube is electrodeless, not electrically connected to the first and is at a floating potential. The simulations are conducted with *nonPDP-SIM*, a 2-dimensional plasma hydrodynamics model with radiation transport. In this model, the 3-d tubes in the experiments are represented by 2-d capillary channels. The experimental diagnostics include ns resolution ICCD imaging. Simulations and experiments show that the primary IW propagates across the inter-tube gap and, upon impingement, induces two secondary IWs propagating in the opposite directions in the transfer tube. Depending on the polarity of the primary IW and the rate of rise ( $dV/dt$ ) of the voltage pulse, the secondary IWs can have polarities either the same or opposite to that of the primary IW.

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