Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Novel Electrode Configuration for Ionic Wind Generation in Air at Atmospheric Pressure DORIAN COLAS, ANTOINE FERRET, IGNAZIO SCIACCA, DAVID Z. PAI, DEANNA A. LACOSTE, CHRISTOPHE O. LAUX, Ecole Centrale Paris — A novel electrode configuration is presented to generate ionic wind with a DC corona discharge in air at atmospheric pressure. The objective of the work is to maximize the power supplied to the flow to increase acceleration while avoiding breakdown. Thus, the proposed experimental setup addresses the problem of de-coupling the mechanism of ion generation from that of ion acceleration. Using a wire-plate configuration as a reference, we have focused on improving the topography of the electric field to 1) create separate ionization and acceleration zones in space, and 2) guide the trajectory of charged particles as parallel to the median axis as possible. In the new wire-cylinder-plate setup, a DC corona discharge is generated in the space between a wire and two cylinders. The ions produced by the corona then drift past the cylinders and into a channel between two plates, where they undergo acceleration. Experimentally, the optimized reference setup and the new configuration provide flow velocities up to 8 and 10 m/s, respectively, as well as a thrust by unit up to 0.24 and 0.35 N/m. In comparison with a DBD configuration, the experimental results show that the generated thrust is an order of magnitude higher.

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Date submitted: 10 Jun 2010 Electronic form version 1.4