

Experimental Corona Wind Profiles

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Abstract— When high voltage is applied to an electrode system in air a small current starts flowing above the corona onset voltage. Ionized molecules and ions created in the highly non-uniform electric field impart momentum to neutral molecules, creating a usually elusive air flow called corona wind. Although the phenomenon is so well known, it appears that rather few studies have focused on the visualization of the corona wind possibly due to the difficulties associated with such visualizations for larger or more complex electrode systems. We previously proposed the use of liquid nitrogen-generated water vapors in conjunction with a laser sheet as a method for obtaining corona wind profiles. Experimental air wind profiles of asymmetric capacitors were recorded for wire-plate single and multiple modules, as well as for linear and circular arrays of pins configurations. Positive voltages up to about +25 kV were used. The experimental profiles may give a more realistic view on the complex induced flows. They can be useful for optimization of different corona wind applications such as electro hydrodynamic thrusters.