

A Full EHD Flow Pattern in Point-Plane Corona Discharge

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Abstract—This paper presents the results of numerical investigations of the EHD flow generated by dc corona discharge in the point-plane configuration in atmospheric air. A computational model of the discharge includes the ionization layer and three ionic species. The most important ionic reactions (ionization, attachment, recombination and detachment) are considered. The secondary seed electrons are generated by the secondary emission from the discharge electrode. The results of the corona simulations were used to predict the secondary EHD flow. All flow parameters (velocity components, pressure, streamlines) are determined. In addition to main flow vortex reported before, a local vortex near the discharge tip has also been discovered. COMSOL, a commercial finite element package, was used in simulations.