

Electrohydrodynamic pump with bipolar corona discharge supplied by unipolar DC voltage

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Abstract— Generation of strong electric field between two electrodes initiates a corona discharge which results in ionization of gas molecules. The gaseous ion flux along the electric field lines induces ionic wind, also known as the electrohydrodynamic (EHD) flow. If an electric field is asymmetric then a unidirectional gas flow can be formed causing so called EHD gas pumping. In spite of many experiments with different electrode shapes and configurations such as needle-to-mesh, needle-to-ring, wire-to-rod, wire-to-non-parallel plates etc., aimed at production of intensive gas pumping, the investigated EHD pumps were still unsatisfactory. In our research, we proposed the new configuration of electrodes of EHD pump, which is beneficial compared to previous solutions. The Particle Image Velocimetry technique was used to investigate our EHD pump.