

FORCES ACTING IN DIELECTRIC BARRIER DISCHARGES THAT RESULT IN AIR FLOW*

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Dielectric barrier discharges have been used to generate air flow in a number of configurations. The analysis of electrical forces by Boeuf *et al*¹ provide a model for estimating forces and flow velocity for plasma actuators. Their work is extended to include the variations in force due to specific ionic species. Dipole forces are investigated as some air species and ions have permanent dipole moments. In addition most air species can acquire a dipole moment equal to the electronic polarizability times the magnitude of an external field. The magnitude of the dipole force increases in regions of the discharge with high E/N and high electric field gradients. The dipole force and electrical forces due to electrons and ions are discussed for different regions in a dielectric barrier discharge and compared to the forces described by Boeuf *et al*¹.

1. J. P. Boeuf, Y. Lagmich, Th Unfer, Th Callegari, and L. C. Pitchford, "Electrohydrodynamic Force in Dielectric Barrier Discharge Plasma Actuators", *J. Phys. D: Appl. Phys.*, Vol. 40, 2007, pp. 652-662.

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