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**STUDENT AWARD FINALIST: Characteristics of Arrays of Independently Controlled RF Micro-Dielectric Barrier Discharges**[1] JUN-CHIEH WANG, U. Michigan, NAPOLEON LEONI, HENRYK BIRECKI, OMER GILA, Hewlett-Packard Res. Labs, MARK J. KUSHNER, U. Michigan — Micro dielectric barrier discharges (mDBD's) are being developed for high pressure, non-thermal plasma sources. The micro-plasma devices (10-100 $\mu$m) of interest are RF-excited arrays where individually controlled apertures are used for charge extraction to treat or pattern surfaces. When using mDBDs to produce plumes of charged species, there are potential interactions between the mDBD devices. In this presentation, we discuss properties of atmospheric pressure mDBD's arrays using results from a 2D simulation. The devices consist of sandwich structures of dc and rf biased electrodes to help shape the plume. The model solves Poisson's equation, transport equations for charged and neutral species, the electron energy equation and Green's function propagator for radiation transport. A Monte Carlo simulation tracks sheath accelerated electrons. We find that the adjacency of the mDBDs and the dielectric properties of the materials being treated are important to operation. Charge extraction and the shape of the plume can be optimized by choice of gas composition and pressure. Scaling laws will be presented for mDBD arrays as a function of frequency and phasing of the arrays.

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Mark J. Kushner
U. Michigan

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