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Modeling the excitation dynamics of micro structured atmospheric pressure plasma arrays[1] ALEXANDER WOLLNY, RALF PETER BRINKMANN, Institute for Theoretical Electrical Engineering — Micro structured atmospheric pressure plasma arrays have been developed by J.G. Eden and coworkers as efficient light sources [1]. In essence, this device forms an array of dielectric barrier discharges: a silicon wafer with a matrix of cavities is covered by dielectrics. The counter electrode grid is embedded in the dielectrics. It is driven by alternating voltage at a frequency of 10-100 kHz in argon at atmospheric pressure. To the naked eye these devices appear to glow homogeneously. However, phase resolved optical emission spectroscopy performed by V. Schulz-von der Gathen and co-workers [2] revealed strong dynamics. The model presented here addresses each cavity independently: cavities are described by a one dimensional drift model. Interactions, mainly driven by photon transport, are treated in a separate model that couples back to the individual cavity models. This allows us to investigate the individual discharge as well as the experimentally observed ionization wave propagation. Both will be addressed in this work.

[1] J.G. Eden, et al., *J. Phys. D: Appl. Phys.* **38** 1644 (2005)
[2] H. Boettner, et al., *J. Phys. D: Appl. Phys.* **43** 124010 (2010)

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