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Spectroscopic Study of an Atmospheric Pressure Plasma Glow through Electric Field Measurements[1] YAO KOVACH, University of Michigan, MARIA GARCIA, University of Cordoba, JOHN FOSTER, University of Michigan — A helium plasma discharge glow, which works under atmospheric pressure, has been developed for analysis of self-organization anode pattern formation on a liquid surface. In our previous study, plasma column characteristics such as gas temperature, electron density and species composition have been determined by means of optical emission spectroscopy (OES) techniques under the condition of self-organization pattern appearances. However, the mechanisms underlying self-organization of plasmas in this context is still poorly understood. In this recent effort, OES was continuously utilized to investigate the Stark Mixing as a means to infer the electric field. At different current interval controls, spatially resolved measurements of the electric field in atmospheric pressure DC glow were recorded from the cathode region to near liquid surface region. This work extends our understanding of self-organization and the physics of the discharge itself by not only interrogating the column to ascertain spatial plasma characteristics but also to understand the underlying mechanism associated with local electric field that might drive the self-organized plasma pattern formation on the liquid surface.

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