

Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Ionization wave dynamics of a plasma jet in contact with liquid water¹ AMANDA M. LIETZ, Univ. Michigan, EDWARD V. BARNAT, CAROLINE WINTERS, Sandia Natl. Lab., JOHN E. FOSTER, MARK J. KUSHNER, Univ. Michigan — Plasma jets are being investigated for biomedical and agricultural applications including cancer treatment, chronic wound healing, and disinfection of produce. In many of these applications, the surface to be treated is coated with a liquid, making understanding plasma-liquid interactions important for the development of this technology. In this paper, laser collisional induced fluorescence and high speed imaging are used to compare a helium plasma jet impinging on water to a jet impinging upon TiO₂, a dielectric having a similar permittivity and thickness. In spite of the capacitance of the water layer and TiO₂ being similar, there are differences in the plasma dynamics. These differences are attributed in part to water vapor evaporating from the surface and becoming entrained in the gas flow, and, in part, from the solvation of charged species and excited states into the liquid. Results from a computational investigation using a 2-dimensional plasma hydrodynamics model of this same system will also be discussed.

¹Work supported by DOE SCGSR and Office of Fusion Energy Science; and National Science Foundation

Mark Kushner
Univ of Michigan - Ann Arbor

Date submitted: 12 Jun 2018

Electronic form version 1.4