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Numerical Simulations of Electron Transport across a Plasma-Water Interface using Zapdos-CRANE[1] SHANE KENILEY, DAVIDE CURRELI, University of Illinois at Urbana-Champaign, COREY DECHANT, STEVEN SHANNON, North Carolina State University — Plasma-liquid systems are experiencing growing interest due to their wide range of applications in low temperature plasmas (medicine, chemical production, chemical processing). Even so, the transport of electrons, ions, neutrals, and their distribution moments, such as heat and energy fluxes, in the interface layer between the plasma and the surface remain poorly understood. In this work, we perform our simulations using the new open-source software package Zapdos-CRANE, built on top of the MOOSE framework, which can be utilized to model general problems involving plasma-liquid interfaces. Zapdos is a multi-species electrostatic plasma transport model, previously used to study plasma-liquid interactions, while CRANE (https://github.com/lcpp-org/crane) is a plasma chemistry software written to solve reaction networks of arbitrary size and complexity. The package is here utilized to model the transport of electrons and heavy species from the plasma into liquid water, and the chemical reactions that occur in the interface layer is examined.

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