**Validation Studies using ELK and the Open Source MOOSE Framework Application Zapdos for Electromagnetic Coupled Plasma Simulation**[1] CASEY ICENHOUR, COREY DECHANT, North Carolina State University, ALEXANDER LINDSAY, RICHARD MARTINEAU, Idaho National Laboratory, DAVID GREEN, Oak Ridge National Laboratory, STEVEN SHANNON, North Carolina State University — An open source simulation platform that captures electromagnetics, plasma chemistry, and fluid treatment of the plasma domain would be a powerful tool for studying low temperature plasma (LTP) phenomena. Within the Multiphysics Object-Oriented Simulation Environment (MOOSE) open source framework, ELK, CRANE, and Zapdos are combined to provide open source simulation capability for the LTP community. This talk presents continued validation of the general electromagnetic (EM) simulation tool ELK (Electromagnetic Library for Kinetics & fluids). Previous validation efforts focused on simulating standard waveguide and antenna benchmarks in vacuum and linear dielectrics, but ELK has since been coupled with the MOOSE-based plasma fluid application Zapdos [Lindsay et al 2016 J. Phys. D: Appl. Phys. **49** 235204] to perform radio-frequency (rf) capacitively coupled plasma (CCP) system simulation. Plasma validation efforts initially focused on electrostatic benchmarks to demonstrate ELK-Zapdos code coupling and then moved to electromagnetic benchmarks based on interesting geometries and conditions (VHF effects in a CCP reactor, microwave heating, etc.). Results and progress in these efforts will be summarized and discussed.

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