Abstract Submitted
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Elk: A New MOOSE Framework Application for Radio-Frequency Electromagnetics[1] CASEY ICENHOUR, ALEX LINDSAY, Idaho National Laboratory, DAVID GREEN, Oak Ridge National Laboratory, RICHARD MARTINEAU, Idaho National Laboratory, STEVEN SHANNON, North Carolina State University — A new tool in-development for general electromagnetic (EM) simulation for modeling radio-frequency (rf) systems is presented. The primary motivation for development of this tool is to leverage the flexibility and high-performance-computing capability of the Multiphysics Object-Oriented Simulation Environment (MOOSE) Framework developed by Idaho National Laboratory (INL) for complex EM problems. A MOOSE application (or MOOSE App) enables the end user to create a fully-functional simulation scenario without needing explicit knowledge of the underlying finite-element weak form implementation. MOOSE combines the libMesh library and the PetSc suite as the finite element and solver libraries, giving a robust platform for solving highly non-linear, coupled sets of PDEs such as those found in EM and plasma physics problems. Initial validation efforts have included standard waveguide and antenna benchmarks with the current focus being field validation against the well-known capacitively-coupled GEC Reference Cell (GEC-CCP). The results of this effort and progress towards coupling to the plasma fluid MOOSE App Zapdos [Lindsay *et al* 2016 *J. Phys. D: Appl. Phys.* **49** 235204] for cold-plasma rf wave propagation studies will be discussed.

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