Abstract Submitted
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Multi-physics simulation of the COST APPJ in the MOOSE framework[1] COREY DECHANT, North Carolina State University, SHANE KENILEY, DAVIDE CURRELI, University of Illinois, KATHARINA STAPELMANN, STEVEN SHANNON, North Carolina State University — The COST atmospheric pressure plasma jet has been modelled using the Zapdos application in the MOOSE framework and compared to previous experimental and simulation efforts. The Zapdos application has been expanded to enable 2D simulation using a plurality of chemical species and time varying electrode potentials. This expanded application is combined with a Navier-Stokes fluid model to study the COST APPJ. This work focuses on expanding Zapdos to multidimensional plasma modeling by introduction more scalability of units than is currently available and incorporation of a simplified plasma chemistry module. The principle behind this method was by scaling the coefficient used in the physical equations, the values in the Jacobian matrix would be reduced resulting in a converged solution. With the proper scaling, 2D results for plasma parameters can be obtain for both a DC discharge and a sinusoidal voltage driven RF discharge. To validate these models, results will be compared to both previously published experimental data and simulation results from different frameworks.

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