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Experimental and Computational Study of Carbon Dioxide Dissociation in an Atmospheric Pressure Microwave Discharge LAURA SPENCER, ALEC GALLIMORE, University of Michigan — Rising concerns of atmospheric carbon dioxide (CO2) concentrations has increased scientific effort to mitigate the effects of global warming. This project proposes using a plasma source to reduce CO2 emissions by breaking down the molecule to CO and O2 via electron impact inelastic collisions. An atmospheric pressure plasma source excited by microwaves is experimentally investigated to demonstrate the dissociation capabilities of the device. Diagnostics are taken using a residual gas analyzer to monitor the gas species present in the plasma discharge, demonstrating that CO and O2 are the main products of dissociation. The experimental results are compared to a global, zero-dimensional kinetic model called GlobalKin, which assumes a homogeneous plasma where the concentration of species is spatially independent.

Laura Spencer
University of Michigan

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