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**Studying Simple Molecular Ionization using Radiation Emission Spectroscopy** CHRISTOPHER PROCTOR, KRISTINA LEMMER<sup>1</sup>, Western Michigan University, WESTERN MICHIGAN UNIVERSITY AEROSPACE LABORATORY FOR PLASMA EXPERIMENTS TEAM — This study focuses on radiation emission from the formation of simple molecular plasma using a DC glow discharge. The purpose is to measure the emission from argon and molecular nitrogen gas as a function of time with an optical emission spectroscopy system operating in kinetic mode as the gases go from their neutral state to ionized state. The end goal of the research is to develop a diagnostic tool that will be used to study the formation of plasma discharges from complex molecules. The kinetic mode of the CCD camera allows for fast data acquisition so that the species present and their relative concentrations as a function of time can be measured as the plasma is forming. The primary difficulty in the development of this diagnostic tool is designing a device and data analysis technique to allow for kinetic mode operation of the CCD camera. Experimental devices have been designed and built to enable the CCD to operate in kinetic mode, including a fiber optic adapter, camera mount, and twin razor blade system. The twin blades allow for the reduction of exposed pixels on the CCD camera and thereby allow the camera to store data on rows of pixels, rather than imaging the entire camera, allowing for faster data transfer.

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