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Microwave Initiated Atomic Spectra from Select Atomic Species[1]
AMAN ANAND, JAMES ROBERTS, University of North Texas, DON HENLEY[2], Office of Research and Technology Transfer, TIMOTHY IMHOLT, Raytheon Corporation, JAI DAHIYA, Southeast Missouri State University — Isotopes of gaseous Helium (^{3}He and ^{4}He) were admitted into the vacuum system at various pressures and allowed to stabilize. Quantum states were then energized using a 2.45 GHz magnetron coupled to the gases by loose coupling. A residual gas analyzer Mode100 series manufactured by Stanford Research Systems was used to determine the mass of each species and an Ocean Optics Optical Spectrometer model collecting the light via an optic probe was used to collect the spectra and to characterize the spectroscopic peaks. The data collected from these isotopes represent characteristic spectral emission lines generated due to the transitions among discrete quantum energy levels. The data analysis, especially for atomic spectroscopy, becomes an extremely important tool in developing an understanding of the quantum levels active within each atom. In this paper is presented a summary of the analysis work that was done on two isotopes of helium. Data using both computational as well as theoretical techniques are presented. Traditional high voltage arc discharge data were taken for the gas species and these are compared with microwave stimulated atomic emissions.

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