TWO-DIMENSIONAL ROVIBRATIONAL SPECTROSCOPY OF ATMOSPHERIC MOLECULES

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Infrared gas phase spectroscopy has a long and rich history of providing detailed information on the structure and behavior of molecules. Recently, the need to develop new techniques has been motivated by pressing problems such as climate change and exciting new opportunities such as the ability to determine the atmospheric composition of exoplanets. These kinds of applications can present challenges for existing 1D spectroscopic methods such as spectral congestion at high temperatures. This talk describes how 2DRV spectroscopy can provide solutions to some of these challenges. 2DRV spectra contain multidimensional patterns with detailed information about molecular structure and behavior for molecules at elevated temperatures. It can also use assignments in less congested lower frequency regions to make new assignments in more congested higher frequency regions. This talk will describe the kinds of patterns that are formed, new methods for creating and analyzing them, and what we can learn from them.