TWO-DIMENSIONAL ROVIBRATIONAL SPECTROSCOPY OF AMMONIA

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This project involves the use of a new technique, Two-dimensional Rovibrational spectroscopy (2DRV), for studying the complex spectroscopy of gas phase molecules such as ammonia. 2DRV has been used to record spectra of a handful of molecules, including methane, propyne, chloromethane, and dichloromethane. The 2DRV spectra of ammonia are especially interesting because of the molecule's large-amplitude umbrella motion and the importance of ammonia in the atmosphere. These spectra also show which vibrational modes are coupled. New 2D analysis techniques provide unique ways of assigning peaks by their vibrational and rotational quantum numbers, and those assignments can be compared with those currently in the HITRAN database.