DYNAMIC ROTATIONAL SPECTROSCOPY OF ALLYL CYANIDE: IR-CHIRPED-PULSE FOURIER TRANSFORM MICROWAVE (CP-FTMW) DOUBLE RESONANCE

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Isomerization dynamics of allyl cyanide (ACN) will be presented. Infrared-Chirped Pulse Fourier Transform Microwave (IR-CPFTMW) double-resonance spectroscopy has been performed to probe the isomerization dynamics of ACN at $\sim$3000 cm^{-1}. ACN is found in one of two conformational minima, *cis* or *gauche*, separated in energy by $\sim$70 cm^{-1}. The rotationally-resolved IR spectrum of the *cis* conformation from 2900-3100 cm^{-1} will be presented. In this experiment, the full 11 GHz rotational spectrum is measured every $\sim$0.01 cm^{-1} step of the IR laser scan. During a single laser scan, the IR-MW double-resonance spectrum is recorded for every MW transition in the 7.5 - 18.5 GHz spectrum. In a second experiment, the IR laser is set to a fixed resonant frequency while the microwave spectrum is measured with signal averaging for enhanced sensitivity. By measuring the dynamic rotational spectrum of the vibrationally excited molecules, we learn 1) whether or not isomerization is occurring and 2) the isomerization rate of ACN. The dynamic rotational spectrum of ACN will be presented for various IR excitation frequencies. The nuclear hyperfine splitting of the dynamic rotational spectrum will be compared to that of the pure rotational spectrum.