ISOMERIZATION DYNAMICS OF CYCLOPROPANECARBOXALDEHYDE USING IR-CHIRPED-PULSE FTMW DOUBLE RESONANCE SPECTROSCOPY

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IR-chirped-pulse FTMW Double resonance spectroscopy is used to examine the vibrationally excited isomerization dynamics of cyclopropanecarboxaldehyde (CPCA). CPCA has two conformers, *cis* and *trans*, which are both populated in the supersonic expansion. The barrier to *cis*$\longrightarrow$*trans* interconversion was found to be 1540$\pm$144 cm^{-1}, where the *trans* form is more stable by 10$\pm$20 cm^{-1} than the *cis*.[a] An in depth investigation into the *cis* to *trans* isomerization dynamics of CPCA for several C-H stretching modes will be presented. We will demonstrate the ability to record isomerization dynamics for CPCA as the laser scans using the IR-Chirped-Pulse FTMW Double resonance technique, which has been recently enhanced for improved sensitivity. Our broadband 7.5–18.5 GHz Chirped-Pulse FTMW spectrometer records the full rotational spectrum for every 0.01 cm^{-1} step of the laser scan frequency. The improved sensitivity allows for detection of the many weak vibrationally excited rotational transitions. The lineshape profile of the excited state rotational spectrum is used to determine the *cis*-*trans* isomerization rate. The dynamics and resulting lineshape profiles vary depending on which infrared frequency is used to prepare the molecule.

[a] H.N. Volltrauer and R. H. Schwendeman, *J. Chem. Phys.* **54** (1971), 260.