SPECTROSCOPIC SIGNATURES OF ISOMERIZATION IN THE $S_1$ STATE OF $C_2H_2$

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Spectroscopic signatures of isomerization between the *cis* and *trans* conformers of the $S_1$ state of acetylene have been studied using a reduced dimension Discrete Variable Representation (DVR) calculation. The calculated rovibrational level structure yields insight into puzzling aspects of the $\tilde{A} \leftarrow \tilde{X}$ band spectrum, including patterns that reveal the effects of the low-barrier *cis-trans* conformational change. Large anharmonicities in modes that project along the minimum energy isomerization path are discussed in the context of the isomerization barrier shape. New high-sensitivity Laser Induced Fluorescence (LIF) spectra have also been recorded in the region of the expected transition state energy in order to detect weak transitions into severely predissociated states, uncovering levels that are in accord with the DVR predictions.