

PREBIOTIC MOLECULES IN INTERSTELLAR SPACE: ROTATIONAL SPECTROSCOPY OF CYANOMETHANIMINE AND ETHANIMINE

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Ethanimine and cyanomethanimine are possible precursors of amino acids, and thus they are considered important prebiotic molecules that may play an important roles in the formation of biological building blocks in the interstellar medium. In addition, their identification in Titan's atmosphere would be important for understanding the abiotic synthesis of organic species. For both molecules, an accurate computational characterization of the molecular structure, energetics, and spectroscopic properties of the E and Z isomers has been carried out by means of a composite scheme based on coupled-cluster techniques. By combining the computational results with new millimeter-wave measurements, up to 300 GHz for ethanimine and to 420 GHz for cyanomethanimine, the rotational spectra of both isomers can be accurately predicted up to 500 GHz for ethanimine and 700 GHz for cyanomethanimine. For the latter, spectral features have been searched in the mm-wave range using the high-sensitivity and unbiased spectral surveys obtained with the IRAM 30-m antenna in the ASAI context, thus sampling the earliest stages of star formation from starless to evolved Class I objects.