A NEW METHODOLOGY FOR THE DETECTION OF LOW-ABUNDANCE SPECIES IN THE ISM: DETECTION OF INTERSTELLAR CARBODIIMIDE (HNCNH)

BRETT A. McGUIRE, *Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA 91125*; RYAN A. LOOMIS, *Department of Chemistry, University of Virginia, Charlottesville, VA 22904*; CAMERON M. CHARNESS, JOANNA F. CORBY, *Department of Astronomy, University of Virginia, Charlottesville, VA 22904*; GEOFFREY A. BLAKE, *Division of Chemistry and Chemical Engineering and Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA 91125*; JAN M. HOLLIS, *NASA Goddard Space Flight Center, Greenbelt, MD 20771*; FRANK J. LOVAS, *National Institute of Standards and Technology, Gaithersburg, MD 20899*; PHILIP R. JEWELL, and ANTHONY J. REMIJAN, *National Radio Astronomy Observatory, Charlottesville, VA 22903*.

We present the first interstellar detection of carbodiimide (HNCNH) in observations towards Sgr B2(N) using data from the publicly available Green Bank Telescope **PR**ebiotic **I**nterstellar **MO**lecular **S**urvey project. Recent laboratory work predicts an abundance of HNCNH of $\sim$10% of the abundance of its tautomer, cyanamide (NH_2CN), or $\sim 2 \times 10^{13}$ cm^{-2} in Sgr B2(N). Given this abundance at LTE conditions, the strongest rotational transitions of HNCNH have intensities at or below the noise level of current observations of this source. A thermal population of HNCNH is therefore likely undetectable. Instead, HNCNH is identified via maser emission features at centimeter wavelengths. This detection presents a new methodology for the detection of low-abundance species and further demonstrates the power of cm-wave observations to make definitive identifications based on a small number of observed features.