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Accession number:20114914583126
Title:Terahertz spectroscopy for space applications: 2.5-2.7 THz spectra of HD, H2O and NH3
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Source title:Journal of Molecular Structure
Abbreviated source title:J. Mol. Struct.
Volume:1006
Issue:1-3
Issue date:December 14, 2011
Publication year:2011
Pages:2-12
Language:English
ISSN:00222860
CODEN:JMOSB4
Document type:Journal article (JA)
Publisher:Elsevier, P.O. Box 211, Amsterdam, 1000 AE, Netherlands
Abstract:At the Jet Propulsion Laboratory (JPL) a vibrant THz development program supports the construction of space-based spectroscopic instruments. The recent successes of the Aura's Microwave Limb Sounder (0.1-2.5 THz) and Herschel's Heterodyne Instrument for the Far-Infrared (0.5-1.9 THz) have demonstrated the wide range of molecular astro- and geophysics accessible when remote sensing from a space platform. With access to the THz spectral range these instruments readily observe the rotational spectra of small molecules, and the laboratory spectroscopy of these molecules is then utilized to convert the remote observation into physical quantities such as density and temperature. At the JPL millimeter and submillimeter spectroscopy laboratory we utilize the same technology developed for the space missions in order to make new or improved spectroscopic measurements that support these remote sensing objectives. By virtue of the improvements in technology these new measurements often result in improved structural understanding for the species of interest. We present an overview of the space applications and report a series of improved measurements in the 2.5-2.7 THz range obtained with our most recent hardware under development for sub-orbital/orbital astronomy.
Number of references:62