THz SPECTROSCOPY OF H$_2$D$^+$

F. MATSUSHIMA, T. YONEZU, Y. MORIWAKI, and K. TAKAGI, *Department of Physics, University of Toyama, Gofuku, Toyama 930-8555, Japan*; T. AMANO, *Department of Chemistry, University of Waterloo, Waterloo, Canada N2L 3G1*.

The pure rotational transition frequencies of H$_2$D$^+$, 2$_{12}$ ← 1$_{11}$, 2$_{02}$ ← 1$_{01}$, 2$_{11}$ ← 1$_{10}$, and 3$_{13}$ ← 2$_{12}$, have been measured in the laboratory precisely by using a tunable far-infrared spectrometer. Among them, the 2$_{12}$ ← 1$_{11}$ line was recently detected in space toward Sgr B2 by Cernicharo et al.\(^a\). Their identification was made based on a calculated line frequency estimated from the spectroscopic data of Amano and Hirao\(^b\). It has been found that our measured frequency of this line, 2363242.82(69) MHz, is lower by about 20 MHz than the estimated value. All the available THz lines and known millimeter- and submillimeter-wave lines together with the combination differences derived from the infrared transitions are fitted to the Watson effective Hamiltonian. A set of improved molecular constants are obtained.
