TERAHERTZ VIBRATION-ROTATION-TUNNELING SPECTROSCOPY OF THE AMMONIA DIMER: CHARACTERIZATION OF AN OUT OF PLANE VIBRATION

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The Terahertz vibration-rotation-tunneling (VRT) spectrum of the ammonia dimer $(NH_3)_2$ has been measured between ca. 78.5 and 91.9 cm^{-1}. The dipole-allowed transitions are separated into three groups that correspond to the threefold internal rotation of the NH_3 subunits. Transitions have been assigned for VRT states of the $A - A$ $(ortho - ortho)$ combinations of NH_3 monomer states. The spectrum is further complicated by strong Coriolis interactions. $K = 0 \leftarrow 0, K = 1 \leftarrow 0, K = 0 \leftarrow 1$, and $K = 1 \leftarrow 1$ progressions have been assigned. The band origins, rotational constants, asymmetry doubling, centrifugal distortion, and Coriolis coupling constant have been determined from the fit to an effective Hamiltonian. These VRT transitions are tentatively assigned to an out of plane vibration with a $K = 0$ state at 89.141305(47) cm^{-1}, and a $K = 1$ state at 86.77785(9) cm^{-1}.