MILLIMETER WAVE SPECTROSCOPY OF THE BENDING VIBRATION OF THE CO-$ortho$N$_2$ COMPLEX

L. A. SURIN, H. S. P. MÜLLER, G. WINNEWISSER, and I. PAK, *I. Physikalisches Institut, Universität zu Köln, Zülpicherstr. 77, D-50937 Köln, Germany*; B. S. DUMESH and E. V. ALIEVA, *Insitute of Spectroscopy, 142092 Troitsk, Moscow region, Russia*.

The bending vibration of the CO-N$_2$ complex has been investigated in the millimeter wave range from 130 to 150 GHz using an intracavity OROTRON jet spectrometer. Initial line positions were based on the IR observation of a bending state for CO-$ortho$N$_2$.[a] Six transitions $P(2)$, $P(1)$, $R(0)$, $R(1)$, $R(2)$ and $R(3)$ associated with the ground and bending state K = 0 levels of the $ortho$N$_2$ spin modification were measured and analyzed. Nuclear quadrupole structure due to the presence of two equivalent ^{14}N nuclei was partly resolved and analyzed to give information about the angular anisotropy of the interaction potential. The quadrupole splitting also facilitated the assignments. The determined frequency of the bending vibration is 139892.459(35) MHz. The nuclear quadrupole coupling constant obtained for the first time for the bending state of CO-$ortho$N$_2$ is χ_{aa} = - 0.768(43) MHz. The drastic difference of this constant from the same one in the ground state suggests that the orientation and motion of the N$_2$ subunit are very different in these two states.

[a] C. Xia, A. R. W. McKellar, and Y. Xu, *J. Chem. Phys.* **113**, 525 (2000).