# Sub-Doppler Measurements and Rotational Spectrum of $^{13}C^{18}O$

G. Klapper, F. Lewen, S. P. Belov[a], and G. Winnewisser

I. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, D-50937 Cologne, Germany
[a] Institute of Applied Physics, Nizhnii Novgorod 603600, Russia

Reprint requests to Prof. G. W.; Fax: 0221/470-5162; E-mail: winnewisser@ph1.uni-koeln.de

Z. Naturforsch. **55 a,** 441–443 (2000); received November 29, 1999

The rotational spectrum of $^{13}C^{18}O$ has been measured up to 1 THz. The lowest rotational transitions of $^{13}C^{18}O$ ($J = 2 \leftarrow 1$ to $J = 6 \leftarrow 5$) have been measured by saturation-dip spectroscopy with an experimental accuracy of 2 kHz. These five low $J$ rotational transitions cover the frequency range between 209 and 628 GHz. The narrow linewidths of about 20 kHz of the saturation dips allowed to resolve the two main hyperfine components. The splitting is caused by coupling of the $^{13}C$ nuclear spin with the rotation of the molecule. The appropriate coupling constant $C_I(^{13}C^{18}O)$ is 33.90(81) kHz.

In addition we have measured in the Doppler limited mode, the line positions of the rotational transitions $J = 7 \leftarrow 6$, $J = 8 \leftarrow 7$, and $J = 9 \leftarrow 8$ with accuracies of 5 kHz. We provide a set of improved constants together with frequency predictions up to 4.1 THz ($J = 40 \leftarrow 39$).