TERAHERTZ ROTATIONAL SPECTROSCOPY OF THE SO RADICAL

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We have recorded pure rotational transitions of SO in the THz spectral range using synchrotron-based Fourier-Transform (FT) FIR and continous wave (CW) THz techniques.

A FT-FIR spectrum of SO has been recorded at the AILES beamline of SOLEIL synchrotron in the spectral range 44–93 cm^{-1} using a resolution of 0.001 cm^{-1} allowing an accuracy on line position of 0.00007 cm^{-1} ($\sim$ 2 MHz). A multipass absorption discharge cell aligned to an absorption path length of 24 m has been used[a]. A continuous electrical discharge (1 A / 980 V) in a flowing mixture of H_2S, He, H_2 and air (respectively at pressure of 0.01, 1.15, 0.14 and 0.06 mbar) was used to produce SO. On this spectrum, 102 transitions of SO have been identified with $N = 31$ to 65. Among the observed lines, 99 are detected for the first time (22 new transitions belong to the HIFI spectral windows). Due to our limited instrumental resolution, transitions involving N ranging from 31 to 43 show unresolved fine structure triplets.

Recently, in order to observe all fine structure components in the HIFI spectral windows, we have recorded a high resolution CW-THz spectrum of SO[b]. At the time of the writing, this spectrum was under analysis.

[a] M. A. Martin-Drumel *et al.*, *Rev. Sci. Instrum.* 82, 113106 (2011)

[b] S. Eliet *et al.*, *J. Mol. Struct.* 1006, 13 (2011)