COLOGNE THZ SPECTROMETERS - DEVELOPMENTS AND APPLICATIONS

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Technical developments of recent years have lead to an extension of the accessible spectral range towards shorter wavelengths and into the so called ”Terahertz region”. Many molecules, especially those of astrophysical importance, have characteristic spectral features at Terahertz frequencies, e. g., the pure rotational transitions of light hydrides, XH and XH_2 (X=C, O, N, S) or the low lying bending modes of carbon containing chain and ring molecules.

The Cologne group uses backward wave oscillators (BWOs) and a far-infrared laser sideband system to cover the spectral range up to 2 THz. New superlattice frequency multipliers have extended the accessible spectral range up to 2.7 THz. The spectrometers are combined with supersonic jet apparatuses where unstable and highly reactive molecules are produced in a cold jet expansion. We report on our latest results and new technical developments on Terahertz radiation sources.

All molecular parameters and line catalogues are made available via the Cologne Database for Molecular Spectroscopy (CDMS) for future observations.