

Project 4.18. Rotational spectroscopy of molecules of chemical, atmospheric and astrophysical relevance.

Supervisor: prof. dr hab. Zbigniew Kisiel

Institute: IFPAN

Unit: ON2.3

www: <http://info.ifpan.edu.pl/~kisiel/on23/on23.html>

Background:

Rotational spectroscopy is the source of reference-quality information on the properties of molecules and their aggregates. In particular, these are precise molecular structures, electric dipole moments, and plentiful data on the intermolecular interaction and vibrational states. The understanding of the laboratory spectrum is a prerequisite to teledetection applications, such as identification of molecules in astrophysical environments (interstellar molecular clouds or planetary stratospheres). The derived molecular data also serve for calibration of quantum chemistry calculations.

Aim:

Measurement and analysis of rotational spectra of selected molecules in the frequency region from 2 GHz to the THz region, with the use of the four spectrometers available in the laboratory, and data obtained by means of international cooperation. At the lowest frequencies spectra would be recorded at conditions of supersonic expansion. The obtained experimental results would be processed mainly with the aid of computer programs available on the PROSPE website: <http://info.ifpan.edu.pl/~kisiel/prospe.htm>.

Requirements:

Curiosity! Predisposition for experimental work: the ability to master complex, computer controlled equipment. Basic experience with electronics, mechanical engineering, vacuum technology.

Familiarity with computer methods: popular operating systems, computer programming, the use and configuration of third-party software.