



## 2 PhD Positions in Optical Frequency Comb Spectroscopy

The Optical Frequency Comb Spectroscopy Group works with development and applications of optical frequency comb spectroscopy (OFCS) for broadband precision measurements and ultrasensitive detection of molecular species in gas phase. We are now seeking two PhD students to work on the following projects:

- 1) **Development of a mid-infrared OFC spectrometer for applications in combustion diagnostics and environmental monitoring.** The system will be based on a difference frequency generation source pumped by an Yb: fiber laser and a cavity-enhanced Vernier spectrometer. In the first phase, the performance of the system will be tested using calibrated gas samples. In the next phase, the system will be optimized for measurement of high-temperature spectra in flames and for detection of atmospheric species in ambient air. The final aim is to make the system portable for detection of hydrocarbons in biomass burning processes, and field measurements of greenhouse gases and other atmospheric species.
- 2) **Broadband precision measurements of molecular spectra with mid-infrared OFCS.** This project will use our existing mid-infrared OFC spectrometer based on a doubly resonant optical parametric oscillator (OPO) pumped by a Tm: fiber femtosecond laser and a fast-scanning Fourier transform spectrometer. The technical part of the project involves implementation of an enhancement cavity to achieve higher absorption sensitivity as well as development of a second OPO source to reach longer wavelengths. The theoretical part of the project is aimed at development of routines to retrieve absorption line parameters from the broadband spectra using proper absorption line shape models.

For a more detailed description of both projects check the [Umeå University webpage](#) or contact [Aleksandra Foltynowicz](#).

The successful candidates should hold a master degree (or equivalent) in experimental physics or electrical engineering. Experience in experimental laboratory research, including optics, electronics, and laser spectroscopy, will be seen as an advantage. The candidates should have interest in both instrumental development and theoretical modelling of signals. The applicants must be highly motivated and have the ability to work independently as well as a part of the research group, and they must be fluent in both oral and written English.

The application should include:

1. A cover letter with a brief description of qualifications, research interests, and motivation.
2. Curriculum vitae.
3. Copies of relevant degree diploma(s).
4. A list of university courses with grades.
5. A copy of master thesis and publications (if any).
6. Contact information of three reference persons.

Other formal requirements and information how to apply can be found at the [Umeå University webpage](#). Applications deadline is **Aug 1, 2016**, and the positions will open in September 2016 (exact start date can be negotiated).