



Postdoctoral Scholarship in Optical Frequency Comb Spectroscopy

The [Department of Physics](#) is active in many research areas, including atomic, molecular and optical physics, laser spectroscopy, biological physics, organic electronics, condensed matter physics, nonlinear and plasma physics, and statistical physics and networks. Laser spectroscopy has been one of the major experimental research fields at the Department for over 15 years, and it belongs to the strong research environment [Light in science and technology](#).

The [Optical Frequency Comb Spectroscopy Group](#) works with the development and applications of optical frequency comb spectroscopy (OFCS) for broadband ultrasensitive detection of molecular species in the gas phase. We have a fully operating OFCS system based on an Er: fiber femtosecond laser, high finesse optical cavity, and a fast-scanning Fourier transform spectrometer. We have recently used this system to demonstrate, for the first time with OFCS, detection of broadband high-temperature water spectra in a flame. Moreover, we have developed a new sensitive detection method, which we termed noise-immune cavity-enhanced optical frequency comb spectroscopy (NICE-OFCS); the technique combines frequency modulation and cavity enhancement in a manner similar to NICE-OHMS in cw spectroscopy, and allows achieving immunity to laser frequency-to-amplitude noise conversion over the broad spectral bandwidth of the optical comb.

We are now developing a mid-infrared OFCS system, which will operate in the molecular fingerprint region and will allow simultaneous detection of a long list of molecular species. We are seeking a postdoctoral researcher to work on the ***development and applications of this mid-infrared optical frequency comb spectrometer***. The source will be an optical parametric oscillator pumped by a high-power femtosecond Tm: fiber laser. The detection system will be based on a Fourier transform spectrometer, coupled with a multi-pass absorption cell and, alternatively, a high-finesse optical cavity. Target applications are in combustion analysis, environmental research, and breath analysis. Contact [Aleksandra Foltynowicz](#) for more information.

The appointment is for one year (with possible extension, based on performance) starting in the fall of 2014. The successful candidate should hold a PhD degree in experimental physics and have experience in laser spectroscopy in gas phase, laser source development, nonlinear optics, and electronics. A strong interest in instrumental development will be seen as an advantage. The applicant should be highly motivated and have the ability to work independently as well as a part of the research group. The candidate should be fluent in both oral and written English.

A complete application should include:

- a motivation letter describing previous research experience and how it suits the announced position;
- a CV with a list of publications;
- copies of relevant publications;
- contact information of two academic referees willing to write a letter of recommendation.

The application should be sent to aleksandra.foltynowicz@physics.umu.se. The position is open until a suitable candidate is found.