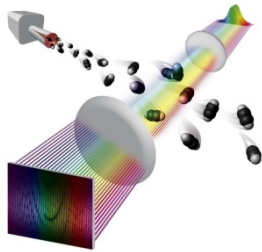


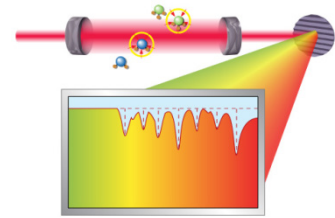
[Optical Frequency Comb Spectroscopy Group](#) announces thesis work:

Data acquisition system for optical frequency comb spectroscopy

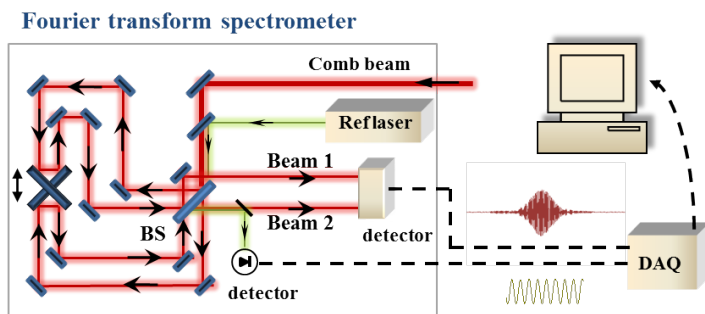
Our group works with the development and applications of **optical frequency comb spectroscopy** for broadband ultrasensitive detection of molecular species in gas phase. Optical frequency combs have been developed at the beginning of the century. They are produced by pulsed femtosecond mode-locked lasers, whose spectrum consists of a comb of



narrow laser lines covering a very broad spectral range. Spectroscopy performed with optical frequency combs is equivalent to a measurement with thousands of synchronized laser lines and allows highly sensitive simultaneous detection of many molecular species in short acquisition times. Therefore it has the potential to become the ultimate tool for trace gas detection in applications such as climate monitoring, industrial process control or medical diagnostics.



We have developed a near-infrared spectroscopic system for detection of gases such as acetylene and carbon dioxide, based on an Erbium-fiber optical frequency comb and a Fourier transform spectrometer. The **Fourier transform spectrometer** is used to obtain the absorption spectrum of the gas sample, from which the concentration of the different molecules is calculated. It is a unique home-built system that acquires absorption spectra in times orders of magnitude shorter than commercially available instruments. It also requires a data acquisition system able to analyze **large amount of data** (interferograms) in times shorter than a second.



The **aim of this project** is to develop a data acquisition and analysis program for our Fourier transform spectrometer in the Matlab environment. We currently use LabView for data acquisition and saving, and Matlab for data analysis. Performing all these functions in Matlab will help reduce the total time and allow implementing additional options. Within this thesis project you will get acquainted with the existing setup and learn about many issues involved in data processing in spectroscopy. The project is suitable for a student with interest in **programming** who is familiar with Matlab and LabView.

If you wish to obtain more information about the project and visit our lab please contact [Aleksandra Foltynowicz](mailto:aleksandra.foltynowicz@physics.umu.se) (aleksandra.foltynowicz@physics.umu.se).