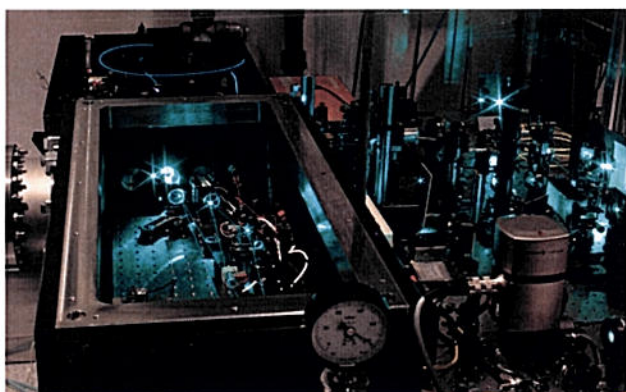


Laser Spectroscopy Division of Prof. T.W. Hänsch at the MPI of Quantum Optics

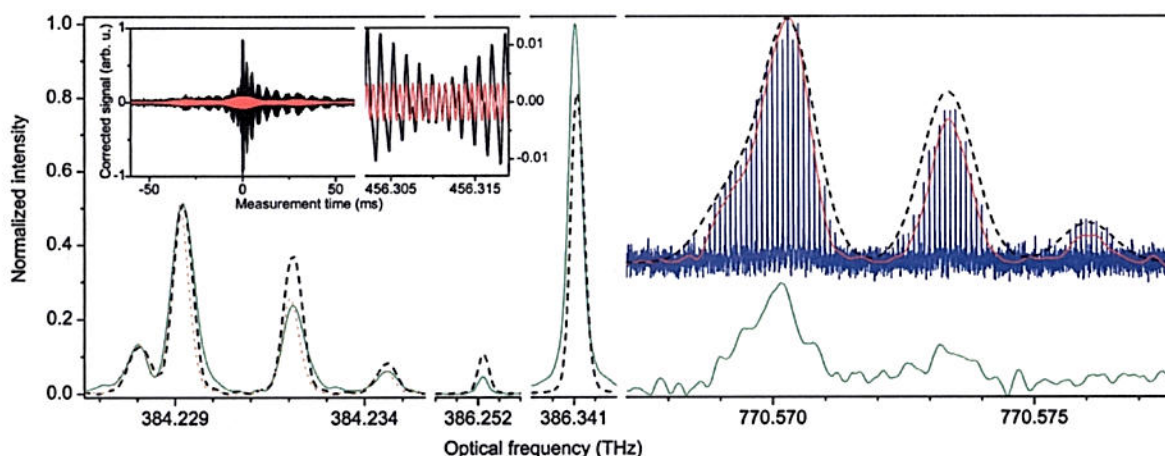
## Master's Thesis

### Real-time dual-frequency-comb two-photon spectroscopy



For our Fourier-transform spectroscopy group, being part of the MPQ's Laser Spectroscopy Division in Garching, we are looking for a motivated Master student who would like to engage in the flourishing field of dual-frequency-comb spectroscopy (DCS). DCS was just recently introduced and offers a multitude of advantages over traditional Fourier-transform spectrometers, e.g. DCS's very short ( $\mu\text{s}$ ) acquisition times allow its use for real-time spectroscopy of irreversible chemical reactions or hyperspectral imaging.

Most of the previous work on DCS has not taken advantage of the frequency comb's suitability (high peak powers) for nonlinear spectroscopy. Currently we are expanding DCS to the various fields of nonlinear optics, including Raman-, CARS, and two-photon spectroscopy/microscopy (see bottom figure for first DCS-two-photon spectra of rubidium). Joining the latter project would give you the opportunity to plan, set up, and perform your own new experiment (all immediately required hardware is available). Along the way you would gain a wealth of knowledge in as diverse areas as atomic & molecular physics, physical chemistry, laser physics, imaging, metrology, and electronics. We offer a top-notch, international research environment, and support a self-organized and flexible work schedule. This position is open as of January 2013. Please contact us if you feel attracted and want to learn more about our research.



Arthur Hipke, MScHons, LMU München & MPQ Garching, Laser Spectroscopy Division,  
089-32905-286, Arthur.Hipke@mpq.mpg.de

Dr. Nathalie Picqué, LMU München & MPQ Garching, Laser Spectroscopy Division, 089-32905-290,  
Nathalie.Picque@mpq.mpg.de