The Laboratory of Attosecond Physics (LAP) located at the Ludwig-Maximilians-Universität (LMU) in Garching, Germany is offering a

PhD position: mid-IR pump-probe spectroscopy with few-cycle pulses

We are searching for a candidate equally interested in femtosecond laser development and in mid-IR time-resolved spectroscopy. Realisation of coherent ultrabroadband radiation in mid-IR spectral range (3-15 μm) is a hot topic in the laser community and will be in the focus of researchers for at least next 5 years. Access to many intriguing scientific and technological areas will become possible in the case of success of this project: ultrafast electronics, gas (breath) analysis, generation of coherent keV photons and attosecond pulses at sub-MHz repetition rates etc.

Based on a laser system LWS-HR that should start operating in the spectral range 700-1400 nm by the middle of 2013 and deliver sub-10 fs 100 μJ-level pulses @300 kHz, we plan to push its spectrum toward 10 μm (and even further depending on success) in frame of the LWS-HR-midIR project. The main tasks for the PhD student will be twofold:
i) laser development, namely development and realisation of schemes of generating coherent supercontinuum in the range 0,5-10 μm with its further parametric amplification in order to generate few-cycle phase-stable pulses of useful energy, development of mid-IR detection and characterization techniques; and
ii) its spectroscopic applications, namely pump-probe spectroscopy of molecules (all of which have fundamental absorption lines in the mid-IR).

The project will be closely connected to others carried out in the same lab: ultrafast electron diffraction and ultrafast dynamics in nanostructures. The laboratory is just started in Garching in the framework of an European project. As the work is mainly experimental, we expect a strong interest of a candidate to work in the lab. Good knowledge of optics, solid-state physics and spectroscopy is desirable, as well as experience with lasers (practical course - Praktikum, diploma work etc.). The PhD student will become a member of a team of researchers and needs to be open to such teamwork.

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