Technische Universität Wien
Atominstitut
Vienna University of Technology
Institute of Atomic and Subatomic Physics
ATOMINSTITUT www.ati.ac.at Stadionallee 2, 1020 Wien, Austria

Call for a PhD Project in experimental quantum physics (3 years)

A UV frequency comb for precision spectroscopy

Laser spectroscopy is one of the most powerful technologies in atomic, molecular, and solid-state physics and has shaped our knowledge and understanding of modern quantum physics. The field has been revolutionized by the development of the frequency comb technique, which allows to link the optical domain to the microwave (and hence electronically countable) regime. This breakthrough was awarded the Nobel prize in 2005 for John L. Hall and Theodor W. Hänsch. Since then, frequency combs have been used for precision spectroscopy and metrology applications, probably most notably in the next generation of atomic clocks. In 2005, two groups (Hänsch and Jun Ye) succeeded in transferring the frequency comb light into the UV range, where virtually no other tunable laser sources are available.

The aim of this thesis project is to (for the first time) establish a full link from the UV to the microwave regime and compare a UV "nuclear atomic clock" to the primary Cs standard.
The Ph.D. thesis will be carried out at the Institute for Atomic and Subatomic Physics (Atominstitut, TU Vienna) in the START group of Dr. Thorsten Schumm, in close collaboration with the research group of Prof. Jörg Schmiedmayer. The project is highly interdisciplinary and touches different research fields, ranging from atomic quantum physics and quantum optics over precision metrology to nuclear physics. The student will acquire hands-on experience in these fields and learn key technologies that will qualify him/her for a further career in academia or industry. In this context the student will have the possibility to travel and collaborate with various research partners (mainly US and Germany) to acquire knowledge and technology.

We offer a highly dynamic and creative environment where the students have a large degree of freedom to explore their own ideas. The framework of the dedicated Graduate School on Complex Quantum Systems provides a tight link to other world-class quantum physics groups in Vienna and provides dedicated courses, invited guest lectures and seminars, soft-skill training and an international thesis advisory committee.

We offer full-time employment as a doctoral student. This includes health and social insurance, etc. associated with normal employments in Austria. Formal requirement: The candidate must hold a Master's degree or equivalent, and is expected to pass the admission criteria of the Graduate School on Complex Quantum Systems (www.coqus.at). A background in (crystal) solid state physics, nuclear physics, spectroscopy, or radio chemistry will be beneficial but not mandatory.

Starting date: from March 2010 on...(flexible)

If you are interested or have any questions, please contact
Thorsten Schumm (Schumm@atomchip.org)