

Sweden: PhD student position in ultrafast quantum optics

Lund University was founded in 1666 and is repeatedly ranked among the world's top 100 universities. The University has 42 000 students and 7 400 staff based in Lund, Helsingborg and Malmö. We are united in our efforts to understand, explain and improve our world and the human condition.

LTH forms the Faculty of Engineering at Lund University, with approximately 9 000 students. The research carried out at LTH is of a high international standard and we are continuously developing our teaching methods and adapting our courses to current needs.

The Department of Physics is with a staff of about 350 scientists and educators one of the largest departments within Lund University. There are seven research divisions and a number of research centra within the department. The research activities at the department cover a broad spectrum of modern physics. www.fysik.lu.se/english.

The research at the division of Atomic Physics is focused around different applications of optics and lasers, ranging from material science to quantum physics, to applications in medicine. The division is a central part in the major interdisciplinary research environment within lasers at Lund University – the Lund Laser Centre. The division is also heavily involved in the undergraduate education, especially within the “Photonics” program.

Job assignment

The main task for the doctoral student will be to conduct research education, which includes work with research but also master graduate courses. The studies are for 4 years, but if teaching is included the position will be extended with the corresponding amount of time, but not more than 5 years. In this position it is expected to do approximately 10% teaching.

Ultrashort coherent light pulses in the extreme ultraviolet (XUV) wavelength region offer the possibility to characterize electron wave packets with unprecedented precision. With the newly developed technique of opto-optical modulation the phase properties of these light pulses can be tailored, both spatially and temporally. The aim of this PhD project is to improve the control of coherent XUV pulses generated either by high-order harmonic generation or with free electron lasers. These pulses will further be used to produce entangled two-electron wave packets, which will be characterized both in time and in momentum. The project will be carried out in close collaboration with the attosecond group in Lund, but also with the aim to find new applications where attosecond pulses in combination with an external field is used to control and characterize electron dynamics in collaboration with the quantum information group in Lund. Most of the work will be done in Lund, but it may also include collaborations with other groups in Europe and in USA.

Entry requirements

A formal requirement for doctoral studies in physics is:

- a university degree on advanced level within a related field, such as a Master's degree in physics or equivalent, or
- substantial advanced course work at the Master level, or comparable, including an independent research project.

A person meets the specific admission requirements if he or she has

- at least 30 credits of relevance to the subject, including at least 15 second-cycle credits, and a second-cycle degree project of 15 credits of relevance to the field, or
- an MSc in engineering in engineering physics or an associated field, or a Master's degree in physics or an associated field.

Furthermore, the acceptance is based on the estimated ability to accomplish postgraduate studies.

Other requirements:

Good knowledge in spoken and written English is a requirement. Good knowledge in the field of optics Good ability to work independently as well as in a research team.

Basis of assessment

Selection to postgraduate studies is based on the expected ability to perform well in the studies. The evaluation of the ability to perform well is based primarily on the results of studies at the basic and advanced levels, in particular:

1. Knowledge and skills relevant to postgraduate studies within the research area, such as a broad and thorough preparation in physics. This can be documented by appended documents.
2. Estimated ability to work independently and the ability to formulate and solve scientific questions. This ability can be established, for example, based on undergraduate research experiences, a Master's thesis or in a discussion of scientific problems during a possible interview.
3. Skills in written and oral communication.
4. Other experience relevant to postgraduate studies, such as professional experience.

Other assessment criteria:

We consider good cooperation ability, drive and independent work ability, as well as skills for experimental work as positive personal attributes. Experience with one or more of the following subjects will be regarded as merits: Femtosecond lasers, non-linear optics, quantum information, high-order harmonics, coherent extreme ultraviolet light

We welcome applications from students who do not have their degree yet but will finish soon and are strongly motivated.

Terms of employment

A PhD position is an employment with the main duty to be engaged in PhD studies according to the study plan. The duration of PhD studies is 4 years full time studies. In addition, those appointed to doctoral student position may be required to work with educational tasks, research and technical/administrative duties at a level of at most 20% of full time. The position is then extended correspondingly, however not longer than corresponding to 5 years full time employment. PhD positions are subject to special regulations. These can be found in the Swedish Higher Education Ordinance (SFS 1993:100, ch. 5, with updates). Only those who are or have been admitted to PhD-studies may be appointed to PhD position.

Application procedure

Apply online! Applications must contain a covering letter in which applicants describe themselves and their particular research interests. Applications must also include a CV, a copy of the applicant's Master's thesis (or a summary text if the thesis is not yet completed), contact details of at least two references, copies of grade certificates, and any other documents that the applicant wishes to refer to. Applicants are also required to answer the job specific questions as the first step of the application process.

Tentative Submission Deadline : 28 February 2018

[Further Information](#)