PhD position in Biophysics with X-ray lasers

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Uppsala University is a comprehensive research-intensive university with a strong international standing. Our mission is to pursue top-quality research and education and to interact constructively with society. Our most important assets are all the individuals whose curiosity and dedication make Uppsala University one of Sweden’s most exciting workplaces. Uppsala University has 46,000 students, 7,300 employees and a turnover of SEK 7.3 billion.

The research conducted at the Department of Physics and Astronomy encompasses a wide range of physics topics, distributed over ten divisions. The department is located in the Ångström laboratory and employs nearly 400 people, 125 of whom are doctoral students. It offers a broad physics curriculum to undergraduate and graduate students, participation in nationally and internationally leading projects for researchers, and opportunities for partnership with industry and various outreach activities.

The Biophysics group within the Division of Molecular and Condensed Matter Physics conducts research on the structure and dynamics of molecular systems using X-rays from synchrotrons and X-ray lasers. X-ray free-electron lasers are novel light sources that provide extremely intense and ultrashort X-ray pulses. These unique properties open new possibilities to determine structural information of biomolecules with atomic resolution, using coherent diffraction before destruction. We study the ultrafast processes induced by the X-ray lasers in biological samples that can lead to radiation damage, non-thermal melting and other transient phenomena on the femtosecond time scale. The overarching goal is to advance our understanding on the structure and function of molecules and have an impact on society, for example proteins that could lead to development of better medicine.
Project Summary: The PhD student will study and develop diffractive imaging with X-ray lasers to investigate atomic and electronic structure of condensed matter and molecules. The project involves using femtosecond X-ray pulses to probe the structure of samples, before these would turn into plasma due to the extreme radiation dose. Elastically scattered X-rays will be used for coherent diffractive imaging, and we also propose to use the X-ray fluorescence from specific atoms to gain further structural information, in what is called incoherent diffractive imaging. Our aim is to gain fundamental insights into quantum optics and ultrafast X-ray physics, to understand X-ray scattering and high-order coherence of X-ray emission from complex plasma environments. We will do theoretical modeling and experiments of X-ray interaction with biological matter, e.g. proteins or organic molecules, to gain knowledge about the practical realisation of experiments at X-ray lasers, and optimise conditions to extract novel structural information. We envision this will lead to a better understanding of biological systems, for example proteins with metallic clusters that catalyse some of the most fundamental chemical reactions on Earth.

Duties: The PhD student shall primarily focus on postgraduate studies, but other duties related to teaching and administrative work may be involved, up to a maximum of 20% of the time. Information about doctoral education, eligibility requirements and admission rules can be found at the faculty website, http://www.teknat.uu.se/utbildning/utbildning-pa-forskarniva/

Requirements: Motivated candidates with an academic degree at the Masters level (or equivalent) in Physics, Biophysics, Chemistry or Applied mathematics. Due to the interdisciplinary nature of the project other areas may also be considered. Excellent knowledge of spoken and written English is an absolute requirement. Personal characteristics such as interpersonal skills, curiosity, a passion for discovery and independence are also important factors.

The application

Your application should be written in English and include:

- A personal letter where you describe yourself, your research interest, your experiences and why you are interested in the position (max. 2 pages).
- A CV containing your education and other qualifications; certificates of exams, degrees and grades, diplomas; a copy of the Master thesis or equivalent, published articles if relevant.
Candidates are encouraged to provide letters of recommendation or contact information to two reference persons.

Rules governing PhD students are set out in the Higher Education Ordinance chapter 5, §§ 1-7 and in Uppsala University's rules and guidelines http://regler.uu.se/?languageId=1.

**Salary:** According to local agreement for PhD students.

**Starting date:** 01-09-2020 or as otherwise agreed.

**Type of employment:** Temporary position according to the Higher Education Ordinance chapter 5 § 7.

**Scope of employment:** 100 %

**For further information about the position please contact:** Nicusor Timneanu, email: nicusor.timneanu@physics.uu.se or Carl Caleman, email carl.caleman@physics.uu.se

**Please submit your application by 1 June 2020, UFV-PA 2020/1627**

Are you considering moving to Sweden to work at Uppsala University? If so, you will find a lot of information about working and living in Sweden at www.uu.se/joinus. You are also welcome to contact International Faculty and Staff Services at ifss@uadm.uu.se.

Please do not send offers of recruitment or advertising services.

**Submit your application through Uppsala University´s recruitment system.**

Placement: Department of Physics and Astronomy
Type of employment: Full time, Temporary position longer than 6 months
Pay: Fixed salary
Number of positions: 1
Working hours: 100 %
Town: Uppsala
County: Uppland
Country: Sweden
Union representative: ST/TCO tco@fackorg.uu.se
Seko Universitetsklubben seko@uadm.uu.se
Saco-rådet saco@uadm.uu.se
Number of reference: UFV-PA 2020/1627
Last application date: 2020-06-01

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