Ph.D. in Physics

Ph.D. scholarship in theoretical and computational physics - Dynamics of liquids and solids

Department of Science and Environment, Roskilde University, invites applications for a position as Ph.D. student of Physics from September 1 or soon thereafter. The position is for a period of three years.

Description of the Ph.D. project
Funded by the VILLUM Foundation for the period 2017-2023, the *Matter* project is an integrated part of the *Glass and Time* center (http://glass.ruc.dk) at Roskilde University's Department of Science and Environment. *Glass and Time* is characterized by strong collaboration between experiment, simulation, and theory. The purpose of *Matter* is to understand the fundamental governing principles of structure and dynamics of liquids and solids, in particular to investigate and further develop the isomorph theory.

We are looking for a talented Ph.D. student for a theoretical/computational project in *Matter*. The student will be trained in state-of-the-art GPU computing and molecular dynamics (http://rumd.org), as well as in theoretical methods associated with the study of liquids and solids. The *Glass and Time* center has exclusive access to one of the fastest computing facilities in Denmark, a GPU-cluster with 400 TFLOP peak performance.

The Ph.D. project will focus on one of the two projects listed here:

- Physical aging, i.e., the gradual change of material properties due to the slow adjustments of molecular positions. Extensive computer simulations will be performed and compared to recent theoretical predictions (Dyre 2015, Hecksher et al, 2015). The ambition is that the simulations should inspire further theoretical development on this subject, which is important both in applied and fundamental materials research.
- Equations of state and quasiuniversality. A new theory of quasiuniversality (Dyre, 2016) deals with the condensed liquid phase, i.e., liquids not far from the melting line - as well as with the crystalline phase. This theoretical and computational project investigates the possibility of developing a quasiuniversal equation of state for systems obeying the isomorph theory and, if possible, extending the isomorph theory to apply also to the gas phase.

References: Dyre, J. C. (2015), J. Chem. Phys. **143**, 114507; Dyre, J. C. (2016), J. Phys.: Condens. Matter **28**, 323001; Hecksher, T. et al. (2015), J. Chem. Phys. **142**, 241103.

Qualifications
The following qualifications are required:

- Master's degree in Physics or a related field
- Strong mathematical skills
- Experience with theoretical work and computer simulations

We are looking for an ambitious, curious and open-minded person. You are expected to possess good communication skills and to be a visible, involved participant in the department's daily activities.

Assessment
In the formal assessment regarding employment consideration will be given to;

- Relevant master's degree or equivalent (according to Danish Qualifications Framework for Higher Education: https://ufm.dk/en/education/recognition-and-transparency/transparency-tools/qualifications-frameworks/other-qualifications-frameworks/danish-qf-for-higher-education?set_language=en&cl=en).

In the assessment regarding enrollment consideration will also be given to the following criteria:

- Grades of your master's study
- Educational skills and any further professional qualifications
- Quality and relevance of the project description (see below)

Application guidelines

Following the official Roskilde University rules, the application must include the below items.

1. *Cover letter*
2. *CV*
3. *Documentation of education including grades from Master's programme or equivalent*
4. *Your description of the Ph.D. project* – Here you describe in which direction you would like to work and how your qualifications fit into this. A detailed project description may be provided, but is not required.
5. *Your time schedule of the Ph.D. project* – Here you state the suggested date of start.
6. *If applicable: Documentation for any research experience, work experience or publications.*

The Doctoral School
You will be enrolled as a Ph.D. student at the Doctoral School of Science and Environment. Read more here https://ruc.dk/doctoral-school-science-and-environment .

Responsibilities and tasks
The Ph.D. position is an educational position and the main tasks are in accordance with Chapter 3, Ministerial Order on the Ph.D. Programme at the Universities and Certain Higher Artistic Educational Institutions (https://ufm.dk/en/legislation/prevailing-laws-and-regulations/education/files/engelsk-ph-d-bekendtgorelse.pdf).

Questions
For further information you are welcome to contact Prof. Thomas Schrøder at tbs@ruc.dk or Prof. Jeppe Dyre at dyre@ruc.dk.

Terms of employment
The employment is on full time, 37 hours per week and formally you will refer to Head of Department, Susanne Sørensen. Ph.D. students have the same rights, formal working hours, vacation, etc., as others in the Danish workforce. After taxes the monthly salary is approximately DKK 18000 (2400 Euro).

Application deadline
Please submit your application no later than **August 1, 2018.**
Material received after this date will not be taken into consideration.
To apply for the position go to www.ruc.dk/en/job/
Only applications in English are accepted.