

Postdoctoral position in electron irradiation of condensed matter

We are seeking applicants for a 16-month postdoctoral position to study spontaneous polarization in molecular ices. The position will be opened at the Department of Physics and Astronomy at Aarhus University, and the candidate will be working within the Center for Interstellar Catalysis.

Expected start date and duration of employment

This is a 16-month position from 1st May 2025 or as soon as possible.

Job description

This position is funded by the Villum Experiment Grant titled “Molecular Motions in Frozen Water”, which aims to study spontaneous polarisation effects in thin layers of water ice that are of relevance to astrochemistry. When dipolar molecules condense on a substrate at cryo-temperatures, the resulting films often spontaneously harbour electric fields that result from the collective ordering of molecular dipoles. This phenomenon manifests as a polarisation potential at the film surface. Direct measurement of the surface potential allows for characterisation of the degree of molecular orientation within the film. Changes in the degree of molecular orientation induced by temperature, for example, can be used to quantify molecular diffusion. This project aims to build an instrument capable of directly measuring these surface potentials and, by doing so, to explore a new method for quantifying molecular diffusion in molecular films.

Other types of experimental data, including scanning tunnelling microscopy imaging and neutron reflectivity will then be used to place the surface potential measurements in context.

The successful candidate will be expected to build an electron irradiation source capable of measuring surface potentials atop condensed films of molecular ices prepared under astrochemically relevant conditions. They will work within the Center for Interstellar Catalysis, under the supervision of project PI Andrew Cassidy and the Center Leader, Liv Hornekær.

The position will include the following tasks;

- To design, build and test a low energy, electron irradiation source.
- To participate in ongoing experiments at the AU-UV beamline at the ASTRID2 synchrotron facility, at the host institution, where this electron source is to be implemented.
- To participate in ongoing neutron reflectivity experiments at the AMOR beamline at the Paul Scherrer Institute, Switzerland
- To participate in ongoing low temperature scanning tunnelling microscopy experiments within the Center for Interstellar Catalysis.
- To assist with the supervision of students involved in the above experiments.
- To be an active, intellectually contributing and supportive member of the Center for Interstellar Catalysis.

Your profile

Applicants should hold a PhD in experimental physics, physical chemistry or a similarly related field.

Demonstrated expertise in some or all of the following areas will be preferred;

- Using synchrotron radiation for surface science experiments.
- Using neutron scattering techniques for characterising the condensed phase.
- Low-temperature scanning tunnelling-microscopy.
- Water ice chemistry and structure.
- Molecular diffusion on surfaces.

Application Deadline:
28 February 2025

Faculty:
Faculty of Natural Sciences

Institute/Faculty:
Department of Physics and Astronomy

Academic contact person:
Andrew Cassidy
Centerchef
amc@phys.au.dk

Vacant positions:
1

Hours per week:
37

Number of months:
16

Expected date of accession:
01/05/2025

Demonstrated expertise in some of the following areas will be beneficial but is not required;

- Experimental astrochemistry.
- Molecular films of water and other ices.
- Molecular diffusion.
- Electron optics.

The applicant should have good proficiency in English and should be able to work positively and communicatively in a team.

Applicants are asked to submit the following documents:

- a 1-page cover letter stating the relevant experience, projects and motivation for applying for the position.
- a cv containing a list of publications and contact details for at least 2 referees.

Who we are

You will join the Center for Interstellar Catalysis, within the Department of Physics and Astronomy at Aarhus University. The Center for Interstellar Catalysis hosts a diverse team of scientists working together to understand the physical and chemical processes that develop chemical complexity in the star forming regions of space. This research team includes theoreticians, observational astronomers and experimentalists. Our experimental facilities are extensive and our research makes heavy use of the ASTRID2 synchrotron facility. This is an international user facility and provides ample networking opportunities.

<https://phys.au.dk/intercat/>

What we offer

- a well-developed research infrastructure, laboratories and access to shared equipment
- an exciting interdisciplinary environment with many national and international collaborators
- a research climate encouraging lively, open and critical discussion within and across different fields of research
- a work environment with close working relationships, networking and social activities
- a workplace characterised by professionalism, equality and a healthy work-life balance.

Place of work and area of employment

The place of work is Department of Physics and Astronomy, Ny Munkegade 120, DK-8000 Aarhus C., and the area of employment is Aarhus University with related departments.

Contact information

For further information, please contact: Center Manager Andrew Cassidy, +45 2362 8776, amc@phys.au.dk.

Deadline

Applications must be received no later than 28th Feb 2025.

Application procedure

Shortlisting is used. This means that after the deadline for applications – and with the assistance from the assessment committee chairman, and the appointment committee if necessary, – the head of department selects the candidates to be evaluated. All applicants will be notified whether or not their applications have been sent to an expert assessment committee for evaluation. The selected applicants will be informed about

the composition of the committee, and each applicant is given the opportunity to comment on the part of the assessment that concerns him/her self. Once the recruitment process is completed a final letter of rejection is sent to the deselected applicants.

Letter of reference

If you want a referee to upload a letter of reference on your behalf, please state the referee's contact information when you submit your application. We strongly recommend that you make an agreement with the person in question before you enter the referee's contact information, and that you ensure that the referee has enough time to write the letter of reference before the application deadline. Unfortunately, it is not possible to ensure that letters of reference received after the application deadline will be taken into consideration.

If you wish to add a referee **after** you have submitted your application, you must send this person's details (name, job title, place of work, and email address) as well as the name of the position you have applied for to: HR.Nattech@au.dk

Formalities and salary range

Natural Sciences refers to the [Ministerial Order on the Appointment of Academic Staff at Danish Universities under the Danish Ministry of Science, Technology and Innovation](#).

The application must be in English and include a curriculum vitae, degree certificate, a complete list of publications, a statement of future research plans and information about research activities, teaching portfolio and verified information on previous teaching experience (if any). Guidelines for applicants can be found [here](#).

Appointment shall be in accordance with the collective labour agreement between the Danish Ministry of Taxation and the Danish Confederation of Professional Associations. Further information on qualification requirements and job content may be found in the [Memorandum on Job Structure for Academic Staff at Danish Universities](#).

Salary depends on seniority as agreed between the Danish Ministry of Taxation and the Confederation of Professional Associations.

Aarhus University's ambition is to be an attractive and inspiring workplace for all and to foster a culture in which each individual has opportunities to thrive, achieve and develop. We view equality and diversity as assets, and we welcome all applicants.

Research activities will be evaluated in relation to actual research time. Thus, we encourage applicants to specify periods of leave without research activities, in order to be able to subtract these periods from the span of the scientific career during the evaluation of scientific productivity.

Aarhus University offers a broad variety of services for international researchers and accompanying families, including relocation service and career counselling to expat partners. Read more [here](#). Please find more information about entering and working in Denmark [here](#).

Aarhus University also offers a Junior Researcher Development Programme targeted at career development for postdocs at AU. You can read more about it [here](#).

At the Faculty of Natural Science at Aarhus University, we strive to support our scientific staff in their career development. We focus on competency development and career clarification and want to make your opportunities transparent. On [our website](#), you can find information on all types of scientific positions, as well as the entry criteria we use when assessing candidates. You can also read more about how we can assist you in your career planning and development.

The application must be submitted via Aarhus University's recruitment system, which can be accessed under the job advertisement on Aarhus University's website.

Aarhus University

Aarhus University is an academically diverse and research-intensive university with a strong commitment to high-quality research and education and the development of society nationally and globally. The university offers an inspiring research and teaching environment to its 38,000 students (FTEs) and 8,300 employees, and has an annual revenues of EUR 935 million. Learn more at www.international.au.dk/