Postdoc position in low-temperature nanoscale angle-resolved photoemission (nanoARPES) on 2D materials and devices

Are you interested in experimental condensed matter physics using synchrotron radiation and can you contribute to the newly funded ERC Consolidator Grant project EXCITE? Then the Department of Physics and Astronomy, Aarhus University, invites you to apply for a fulltime 2-year postdoc position, starting 1 February 2025, in order to help commission a cryogenic cooling system on the nanoARPES beamline of ASTRID2 and use the capability to study novel correlated electronic phases in quantum materials.

Application Deadline:
06 November 2024

Institute/Faculty:
Department of Physics and Astronomy

Faculty:
Faculty of Natural Sciences

Academic contact person:
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Vacant positions:
1

Number of months:
24

Hours per week:
37

Expected date of accession:
01/02/2025

Expected start date and duration of employment
This is a 2–year position from 1 February 2025, or as soon possible thereafter.

Job description
You are expected to contribute to the commissioning of a new cryo-cooling system on the existing SGM4 nanoscale angle-resolved photoemission spectroscopy (nanoARPES) beamline of the synchrotron radiation source ASTRID2 and use it to study correlated phases in 2D materials, devices, twisted superstructures, bulk quantum materials and heterostructures.

- You will take an active role in installation, testing and development activities surrounding the cryo system and integrating it with the SGM4 infrastructure.
- The scientific aim is to measure hidden phases of correlated electrons as a function of temperature, doping and optical excitation parameters (using a femtosecond laser source in combination with our synchrotron ASTRID2).
- You will probe transition metal dichalcogenide charge density wave compounds, high temperature superconductors and Mott insulators in combination with 2D materials such as graphene. You will integrate these compounds in devices that are compatible with photoemission experiments.
- You are expected to play a key role in keeping the nanoARPES system with attached laser and sample preparation systems running by leading maintenance and upgrade activities, as well as participate in activities and projects surrounding our ASTRID2 Institute of Storage Ring Facilities (ISA).
- It is required that you are willing to participate in external beamtimes, adding complementary information on the probed samples, at international synchrotrons and ultrafast laser facilities in Europe and the USA by contributing leadership at the experiments at the facilities.
- These main tasks are performed as part of the objectives of an ERC Consolidator project called EXCITE.

Your profile
Applicants should hold a PhD in Condensed Matter Physics (or related field) and are expected to have experience within the following research areas:

- Electronic structure of quantum materials (f.ex. charge density wave materials, graphene and monolayer semiconductors)
- Angle-resolved photoemission spectroscopy or similar techniques to probe excitations in solids
- Use of synchrotron beamline facilities to investigate properties of matter

The applicant is required to demonstrate:

- A good track record of designing, maintaining and applying ultrahigh vacuum systems in the context of experimental physics.
- Experience with handling of 2D materials and their heterostructures integrated in

device architectures.

Experiences with nanoscale angle-resolved photoemission (nanoARPES), femtosecond time-resolved (TR-)ARPES and with analysis of photoemission data resulting from such experiments are considered major advantages.

The applicant is expected to be a team-player that is strongly motivated to work with students and external collaborators.

Who we are

You will take part in a research team that is strongly devoted to uncovering electronic properties of new materials and develop state-of-the-art synchrotron- and laser-based techniques. Our research is based around the synchrotron source ASTRID2 in Aarhus where we operate a beamline for angle-resolved photoemission experiments, in addition to hosting facilities for isolating and transferring 2D materials. We have strong collaborative ties with some of the most advanced international facilities for conducting photoemission experiments on nanoscale and two-dimensional materials, providing ample opportunity for networking. The research program is organized under an ERC Consolidator Grant project (EXCITE).

What we offer

The successful candidate is offered a chance to participate in the commissioning of a new cryo-cooling system on the SGM4 nanoARPES branch of ASTRID2 and contribute to the research direction of this new facility. A significant share of photons is available from ASTRID2 to conduct experiments on site, and several external beamtimes are foreseen via beamtime applications to the Advanced Light Source in the USA, Diamond Light Source and the Central Laser Facility in the UK.

We offer a working environment characterized by close teamwork and a lively research climate at our ASTRID2 facility.

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: Associate Professor Søren Ulstrup, +4522927702, ulstrup@phys.au.dk.

Deadline

Applications must be received no later than 6 November 2024.

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.

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/