Postdoc in two-dimensional orbitronics and memory device studies with angle-resolved photoemission spectroscopy

The Department of Physics and Astronomy, Aarhus University, invites applications for a 2-year postdoc position, starting September 1st 2026, offering applicants an exciting opportunity to join a new research project on orbitronics and metastable states in two-dimensional quantum materials. The project involves fabrication of devices and their integration with the existing angle-resolved photoemission (ARPES) infrastructure at the ASTRID2 light source to discover quantum geometric effects and their link to new forms of transport phenomena.

Application Deadline:
04 June 2026

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:
01/09/2026

Starting Date and Period
The position is for 2 years and is available from September 1st 2026 or as soon as possible hereafter.

Job description
You are expected to contribute to the development of new types of 2D material devices that can realize orbital, spin and valley Hall effects that form the basis for prototypical memory devices. You will command and expand a series of novel infrastructures to achieve these goals, including semi-automated fabrication systems in inert environments, clean-room facilities for device production, micro-focused synchrotron light for ARPES characterization at ASTRID2 as well as ultrafast femtosecond laser pulses for optical control of the materials.

- You will take a leading role in defining, designing and manufacturing advanced 2D devices that are compatible with our microARPES experiment at ASTRID2 with the specific aim to uncover orbital-driven phenomena in materials.
- The scientific goals are to combine synchrotron and ultrafast laser sources to visualize, excite and control electronic states with distinct orbital and spin textures in quantum materials.
- You will work with metallic and semiconducting transition metal dichalcogenide, including materials that are sensitive to ambient conditions, which requires development of new techniques to isolate and integrate such materials with devices for photoemission experiments carried out in UHV conditions.
- You are expected to play a leading role in the laboratory and be the main driver for maintenance and upgrade activities in relation to the device fabrication infrastructure as well as their interface to the ARPES and laser systems.
- You are expected to contribute to the training and education of students in relation to project activities, as well as being a team-player in the group in relation to being open and supportive of your colleagues and in group related activities.

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 two-dimensional materials (f.ex. graphene, hBN and monolayer transition metal dichalcogenide semiconductors)
- Angle-resolved photoemission spectroscopy or similar techniques to probe excitations in solids
- Experience with exfoliation and stacking of 2D materials and their heterostructures, as well as integration with device architectures.

The applicant is required to demonstrate:

- A good track record of designing, maintaining and applying ultrahigh vacuum systems in the context of experimental physics.

- Use of synchrotron beamline facilities to investigate properties of matter

The applicant is expected to be a team-player that is strongly motivated to work with students and external collaborators, as well as being supportive and open towards other group members.

Who we are

You will take part in a research team that is strongly devoted to uncovering electronic properties of new materials using 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 stacking 2D materials into devices. 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 primarily organized under an ERC Consolidator Grant project (EXCITE) and a Villum Ascending Investigator project on orbitronics.

What we offer

The successful candidate is offered an opportunity to contribute to a competitive new program on developing orbitronic devices with 2D materials, guided by unique microARPES experiments. You will be given freedom and responsibility to command our infrastructures for building and characterizing 2D material devices. A significant share of photons is available from ASTRID2 to conduct experiments on site, giving a unique opportunity to operate and use a synchrotron beamline.

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

Place of Work

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 4th June 2026.

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.

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 37,000 students (FTEs) and 8.700 employees and has an annual revenue of EUR 1.106 billion. Learn more at www.international.au.dk/