

Postdoc fellowship in orbital electronics

Uppsala University is a comprehensive research-intensive university with a strong international standing. Our ultimate goal is to conduct education and research of the highest quality and relevance to make a long-term difference in society. Our most important assets are individuals whose curiosity and dedication make Uppsala University one of Sweden's most exciting workplaces. Uppsala University has over 45,000 students, more than 7,000 employees, and a turnover of around SEK 7 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 for undergraduate and graduate students, participation in nationally and internationally leading research projects, and opportunities for industry partnerships and various outreach activities. Here, the Condensed Matter Physics of Energy Materials research program aims to develop an understanding of electronic properties at the atomic level and of new functional materials for energy and environmental applications.

Webpage: <http://www.physics.uu.se>

Research group: The [Quantum Material Device](#) (QMD) group at Uppsala University, is funded by the European Research Council (ERC) and the Knut and Alice Wallenberg (KAW) Foundation to push the boundaries of quantum materials research. The group's overarching research focuses on developing innovative quantum-material devices, investigating charge, spin, and orbital quantum phenomena, and exploring their potential for applications such as energy-efficient spin memory and logic, flexible spintronic devices, exotic quantum sensors, and intelligent spin-integrated and neuromorphic circuits. The group employs two-dimensional (2D) crystals such as graphene, 2D semiconductors such as the dichalcogenides MoS₂ and MoSe₂, 2D insulators like hexagonal boron nitride, and specialized laminates and precisely angle-oriented 2D van der Waals heterostructures. Experiments involve comprehensive low-temperature (down to 10 millikelvin) charge and spin transport and magneto-optics to uncover novel ordering, exotic charge and spin phenomena, and emergent physics. The group employs advanced microscopic and spectroscopic tools (including X-ray) to probe device in operando.

Project description: Spin-polarized electrons form the basis of spintronics, that has enabled ultrahigh-density magnetic memory storage and precision sensing. In addition, the orbital angular momentum is also a quantum property that can be harnessed to create novel orbital electronic devices. Over the past decades, the advent of graphene and other atomically thin 2D materials, such as graphene-like materials, has brought a fresh stimulus for spintronics. This project aims to understand, observe, and realize novel charge, spin, and orbital phenomena using thin film heterostructures, including 2D materials. The project involves advanced nanofabrication in state-of-the-art cleanroom facilities at Ångström Laboratory and precision measurements using several cutting-edge experiments recently set up by the QMD group.

Responsibilities: The postdoctoral researcher should be committed to conducting competitive research. The postdoc will develop novel devices using state-of-the-art cleanroom tools and/or perform characterization using high-precision, low-temperature magneto-transport and magneto-optic measurement tools; take responsibility for timely reports, manuscripts, presentations, and notes; and participate in and assist with assigned academic and research tasks relevant to the group. He or she is expected to conduct research within the

group's objectives with cooperation and collaboration and must be organized and follow a structured approach to work.

Qualifications: Highly motivated candidates with demonstrated experience in cleanroom-based nanofabrication of devices (preferably graphene, 2D materials) and flexible electronic devices. Experimental abilities in performing electrical characterization and low-temperature measurements (experience with a dilution refrigerator will be advantageous), instrumentation, learning new techniques, troubleshooting instrumentation, optimizing, and developing newer methods. An excellent command of English is necessary. Expertise in writing and presentation of scientific results should be outlined in the application. Having a great capacity to work and meet deadlines is highly valued. You must be intrinsically motivated to conduct groundbreaking science, be cooperative, proactive, pedagogical, well-organized, attentive to details, and enthusiastic. You should be solution-oriented, make informed decisions, and work carefully and efficiently, individually and in groups where credit is shared.

To qualify for a postdoc position, you must have a doctoral degree in physics, engineering physics, or a relevant field. The scholarship requirement is that you have not been employed on a scholarship previously at Uppsala University.

The application should be written in English and include the following:

1. A letter of intent with a short description of your research background, why you feel you are a good match for the project, and your motivation. (max two pages).
2. CV, including a description of relevant skills and experiences and a complete publication list.
3. A copy of your Ph.D. degree or date of thesis submission and details.
4. Contact information for a minimum of two (ideally three) individuals who can provide letters of reference to support your application, briefly mentioning how these individuals are professionally related to you.

Please send your application to venkata.mutta@physics.uu.se

Type of employment: Temporary position for 12 months, with a possibility for extension for a second year, upon mutual agreement.

Starting: 2026-10-01 or as mutually agreed upon.

For further information about the position and scientific aspects of the application, please contact

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Please apply by August 31, 2026