2Dtronics: Spin and Charge transport in low-dimensional novel quantum materials

GRIEG: Polish-Norwegian research projects

PhD positions in theoretical condensed matter physics

We seek outstanding candidates for 3 PhD positions in theoretical condensed matter physics in the Department of Mesocsopic Physics, at the Faculty of Physics of Adam Mickiewicz University in Poznan, Poland.

The appointment will involve research under the supervision of Prof. UAM dr hab. Anna Dyrdał, in direct collaboration with research partner QuSpin-NTNU Norway (Dr. Alireza Qaiumzadech). The PhD students will also get mentoring from experts: Prof. dr hab. Józef Barnaś (AMU) and Prof. Arne Brataas (NTNU), and will also have access to few-month internships at NTNU and/or other research groups.

The position is covered within GRIEG project 2Dtronics which is a part of the Basic Research Programme funded by the Norwegian Financial Mechanism and operated by the National Science Centre in Poland.

FORM OF EMPLOYMENT: scholarship

REMUNERATION: 5000 PLN (ca. 1140 EUR) per month

From the scholarship a contribution to the social insurance (ZUS) should be deducted.

TIMELINE: 33 months (6 semesters)

Since the duration of a doctoral program at the Doctoral School shall be eight semesters, there is a **possibility of up to one-year extension after 6th semester**. The remuneration during the 7th and 8th semester will depend on Doctoral School regulations and scientific achievements of PhD student.

REQUIREMENTS:

- master thesis in the theory of solid-state physics
  (preferably in the issues related to spintronics, electron transport in nanosystems, magnetism)
- a solid background in theoretical physics (quantum transport, quantum field theory, many-body theory, and/or topological phases of matter).
- good written and oral English skills
- the candidates should be creative, independent, well organized and have a strong ability to work problem oriented

PhD position requires admission to the Doctoral School of AMU and participation in the organized doctoral program

PREFERRED SELECTION CRITERIA:

- experience with numerical calculations
- experience in analytical calculations using Green function formalism
  or semi-classical description based on the Boltzmann equation
- experience in ab-initio modelling in the field of spintronics

SCOPE OF THE WORK:

PhD-1 will be involved in the theoretical description of linear and non-linear transport phenomena. Using model Hamiltonians he/she will carry out analytical and numerical calculations within the Green functions formalism. and also will be involved in the development of theoretical approach to time-dependent transport properties.

PhD-2 will take part in the modeling of nanostructures. This person will be responsible for transport calculation (model systems and ab-initio calculations) in hybrid structures consisting of quantum materials.

PhD-3 will be involved in the study of magnetoresistance in transport through 1D domain walls and 2D skyrmions in metallic antiferromagnetic systems. He/she will also work on analytical and numerical description of transport in antiferromagnetic materials and will take part in micromagnetic simulations.

HOW TO APPLY:

The application must include:

- **CV, certificates and diploma**
  (+ diploma supplement: list of courses with grades)
- **Cover letter** (within you indicate preferable PhD position: PhD-1, PhD-2 or PhD-3)
- **Reference Letter** (it should be sent directly to PI)
  from the supervisor of your master thesis
  or from the advisor of current research activities

- **Academic works** (published or unpublished)
  that you would like to be considered in the assessment. If it is difficult to identify your contribution to joint works, you must attach a brief description of your participation
- **Consent to the processing of personal data**
  for the purposes of recruitment procedure

The documents should be sent directly to the project PI (Anna Dyrdał) via e-mail: adyrdal@amu.edu.pl

Application deadline: 18.08.2020 (we will contact only with selected candidates)

Questions about the project and positions can be directed to Anna Dyrdał: adyrdal@amu.edu.pl

Information about 2Dtronics: http://zfmezo.home.amu.edu.pl/GRIEG.php

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