PhD project

Caloric effects in magnetic Weyl semimetals

Description

Topological materials, including the recently discovered Dirac and Weyl semimetals (WSM), lead to a paradigm shift in science due to their inter-twinned spin and charge properties, protected against backscattering. Overlooked up to now, energy and heat transport properties of WSM, and their coupling with spin and charge degrees of freedom are at the center of this PhD project. In particular, coupled properties, allowing to convert e.g. heat to charge current, are expected to be boosted by peculiar topological effects in WSM.

The aim of this PhD project is to perform ultra-low-noise heat and charge transport measurements on magnetic Weyl semimetals at low cryogenic temperatures and high magnetic fields. This very versatile project combines micro-/nano-fabrication, experimental nanoelectronics, magnetism and materials science.

The Gehring-lab is one of the forerunners in functional quantum devices, with extensive hands-on experience in material sciences, nanotechnology, and mesoscopic physics. Our multidisciplinary background will allow us to give you the best-possible training and help you to make this ambitious project a success.

Your thesis will be fully funded for 4 years by the EOS project CONNECT (www.eos-connect.be). You will be working in an international environment in one of the leading universities of Europe, with access to the state-of-the art micro/nano fabrication and testing facilities. You will be contributing to a challenging, interdisciplinary topic in a team comprising of physicists, material scientists and electrical engineers.

What you will do

- Work in a state-of-the art clean room.
- Fabricate nano-devices capable of measuring the electrical, thermoelectric and thermal transport properties of thin films.
- Cryogenic electrical/thermal quantum transport measurements.
- Hands on experience in operating cryostats.
- Data evaluation and modelling.
- Actively interact (scientific exchanges, collaborations, discussions, …) with other members of the EOS-CONNECT consortium.
- Present your results in scientific articles and on international conferences and workshops.

Who you are

- MSc degree in Physics, Nanoscience, Materials science, engineering or a related area.
- Strong experimental and analytical skills.
- Motivated to pursue a versatile project combining hands-on work and data modelling.
- Creative and organized, with a keen interest in interdisciplinary research.

- Collaborative attitude, with good interpersonal and communication skills.
- Proficient in spoken and written English.

Conditions of employment

This PhD position is funded for 4 years. The position can start as soon as April 2022 or later (flexible!).

Environment

UCLouvain, a world-renowned university. With a rich tradition of excellence since its founding in 1425, UCLouvain today plays a leading role in the Europe of knowledge.
You will join the Gehring-Lab (www.gehring-lab.com) which is part of Nanoscopic Physics division @UC Louvain. Our lab is equipped with cryogenic scanning probe and ultra-low noise measurement equipment. You will have access to the state-of-the-art WINFAB platform for device fabrication and characterisation.

Interested?

Are you interested in joining our team and pursuing an interdisciplinary, challenging PhD project at UCLouvain? Or do you need more information?

Please contact Prof. Dr. Pascal Gehring (pascal.gehring@uclouvain.be).

There is no deadline for applying to this position. Interviews will be performed continuously and the call will be closed as soon as a suitable candidate is identified. To formally apply to this position, please provide the following documents:

1. **a research proposal (max 2 pages) about the PhD topic *"Caloric effects in magnetic Weyl semimetals"* which should contain:**
    a. **Goals of the research**
    b. **State of the art**
    c. **Description of the research project (work packages, milestones)**
    d. **Work plan**
2. **a letter of motivation**
3. **a scientific CV**
4. **a transcript of your master's degree**
5. **the name of 3 references (senior scientists).**

Incomplete applications will not be considered.

The host institutions has supportive policies in place to facilitate a diverse and inclusive working environment (https://uclouvain.be/en/discover/equality). We strongly encourage applications from women and under-represented groups.