PDF position- Ultrafast graphene photodetectors for integrated photonic circuits

Record number : OPR-1389

Overview

RESEARCH DIRECTION

Mathieu Massicotte, Professeur - Department of Electrical and Computer Engineering

INFORMATION

mathieu.massicotte@usherbrooke.ca

ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie électrique et de génie informatique
Département de génie mécanique
Institut interdisciplinaire d'innovation technologique (3IT)
Institut quantique

LEVEL(S)

Stage postdoctoral

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation technologique
Institut Quantique Sherbrooke

Project Description

Integrated photonics is a promising technology that can revolutionize digital applications such as artificial intelligence and quantum sciences. Optoelectronic devices are the foundation of photonic integrated circuits, converting electrical signals into light and vice versa at high speed. A major goal in telecommunications is to develop optoelectronic devices that operate even faster. However, conventional materials like silicon are reaching their limits, requiring new materials with superior optoelectronic properties. Graphene, a single layer of carbon atoms, is a strong candidate due to its exceptional optical and electronic properties. It can convert light signals into electrical signals within a few picoseconds [1], making it highly promising for ultrafast photodetection.

Research project: We seek a well-qualified and motivated postdoctoral researcher to help develop a chip-integrated, ultrafast photodetector based on graphene (Fig. 1). The project will focus on designing, fabricating, and characterizing these photodetectors using state-of-the-art nanofabrication and optoelectronic measurement tools. These tasks will be carried out in collaboration with industrial partners Teledyne-DALSA and CMC Microsystems within the framework of a new Research Chair on nanomaterials for integrated photonics.

Research environment: The postdoc will be supervised by Prof. Mathieu Massicotte from the Department of Electrical and Computer Engineering at the Université de Sherbrooke, principal investigator of the Nano-Opto-Electro Group (www.optonanoelectro.com). Research will be conducted primarily at the Interdisciplinary Institute for Technological Innovation (3IT) and the Institut Quantique (IQ) at UdeS. 3IT is a unique Canadian institute specializing in innovative technologies for energy, electronics, robotics, and health, featuring a state-of-the-art cleanroom with complete micro-nanofabrication infrastructure. IQ is a cutting-edge research institute bringing together world-class experts in quantum science and engineering. The postdoc will benefit from an interdisciplinary environment, working alongside students, technicians, and professors to develop next-generation technologies.

Candidate profile:

• PhD in engineering, physics or photonics.
• Experience and skills in integrated photonics measurements.
• Background knowledge in semiconductor physics, photonics, and/or microfabrication
• Excellent adaptability, autonomy, teamwork and problem solving skills.
• Assets: knowledge or experience in cleanroom environment, CAD modeling (ex.: Lumerical).

To apply please send the following documents to one@usherbrooke.ca
• Curriculum Vitae.
• Cover letter emphasizing the relevance of your experience with the proposed subject.
• Letters of recommendation and/or contact details of 2 references.

[1] Massicotte, M. et al. Hot carriers in graphene-fundamentals and applications. Nanoscale 13, 8376–8411 (2021).

Discipline(s) by sector

Sciences naturelles et génie

Génie électrique et génie électronique,
Génie mécanique

Funding offered

Yes

$ 50 000 annual

Partner(s)

Teledyne DALSA Semiconductor Inc., CMC Microsystems

The last update was on 22 June 2026. The University reserves the right to modify its projects without notice.