

INSTITUT NEEL Grenoble - IMEP-LAHC Chambéry

Post-doctoral position Quantum Terahertz Nano-Electronics

Context : Nanoelectronics is undoubtedly one of the important driving forces of today's consumer electronics and is at the heart of the semiconductor industry roadmap for downscaling and introducing new technologies. As a general trend, nanoelectronics experiments are shifting towards frequencies in the GHz range and beyond. These frequencies are now becoming comparable to the internal characteristic time scales that set the quantum dynamics of the devices, resulting in new opportunities for studying the dynamical aspects of quantum mechanics. However, these picosecond timescales are beyond what is presently achievable with standard radiofrequency electronics and require the use of alternative generation techniques such as ultrafast optoelectronics. Actually, the use of pulsed lasers delivering femtosecond duration optical pulses allow the generation of electromagnetic pulses with pulse duration as low as half a picosecond with frequency component in the THz range.

With this project we would like to bridge this timescale gap by leverage on the progress made on THz photon production and use clever photon to electron conversion devices to engineer THz electronic charge pulses that could be used in quantum nanoelectronics. This first milestone in THz electronics would already unlock many limitations of current technologies.

Objectives: The research is focused on the development of a new technique to generate picosecond voltage pulses for the realisation of novel and fundamental quantum experiments in the field of nanoelectronics. To realize such THz electronics, we will implement well-known techniques from ultrafast optoelectronics and make them compatible with quantum nanoelectronic circuits. The development of such a breakthrough technology for quantum nanoelectronic devices will allow us to attain a regime in a time domain where completely new physical effects can be explored.

Possible collaboration and networking : The research will be done in close collaboration between the THz group at IMEP-LAHC University of Savoie Mont-Blanc in Chambéry, the Quantum Coherence group at the Neel Institute, CNRS-Grenoble, and the Theory group at CEA Grenoble, France.

Required profile : We are looking for post graduate researcher (Post Doc) holding a PhD in Physics, Optics or Electronics with a strong background in physics and optics. A previous experience in experimental THz optics or ultrafast laser science will be of advantage. The successful post-doctoral fellow should have a background in at least one of the following fields: THz optics, ultrafast optics, quantum transport, quantum nanoelectronics, low temperature physics.

The candidate is expected to work in close collaboration with the two experimental teams (THz group and Quantum Transport group). He / she should have demonstrated his /her ability for interdisciplinary collaboration with applied researchers and a corresponding track record of publications.

To apply for this position, please send your application as one single PDF file to Christopher Bauerle and Jean-François Roux (see coordinates below). The application should contain a motivation letter including a short exposé with an outline of your research interests, CV, Master certificate + grade sheets and two reference contacts.

Foreseen start for the position: earliest: January 2016

Salary: between 2000-2300 €/net depending on qualification

Duration: 12 months (extendable up to 3 years)

Contact : Christopher BÄUERLE & Jean-Francois ROUX

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More information: <http://neel.cnrs.fr> ; <http://imep-lahc.grenoble-inp.fr/>

