



PhD Fellowship position Néel Institute, CNRS-Grenoble, France

“Quantum interference with single flying electrons”

Interference experiments are at the heart of quantum mechanics and have led to immense achievements over the last two decades, in particular in the field of quantum optics. Due to the tremendous progress in nanofabrication techniques, it is now possible to isolate and manipulate coherently *single* electrons, which opens the way to perform quantum optics like experiments with electrons. The fact that a *single* electron can be transported with surface acoustic waves (SAWs) [Hermelin, Nature 2011], new quantum entanglement schemes can be envisioned due to the strongly interacting nature of electrons compared to photons.

The aim of the proposed PhD subject is to develop all the basic bricks such as beam splitters and phase shifters to implement quantum optics experiments at the *single* electron level with the final goal to perform quantum interference experiments with SAW driven single flying electrons.

This PhD fellowship is part of the **SAWTrain** - Marie Skłodowska-Curie Innovative Training Network offering joint research training at the PhD level on the physics and applications of surface acoustic waves (SAWs) in semiconductor structures and related materials. Within this fellowship the candidate will have the unique opportunity to realize short-term research stays at various internationally renowned research institutions (NTT Basic Research Lab, Japan; Cambridge University, UK; Paul-Drude Institute, Germany).

Located in the heart of an unique scientific, industrial and cultural environment, **the Néel Institute** is the largest French national research institute in condensed matter physics. It is part of one of Europe's biggest high tech environment in micro- and nanoelectronics, right next to the French Alps.

The candidate should have good knowledge in at least two of the following fields: quantum mechanics, mesoscopic transport, solid-state physics / physics of semiconductors, nanofabrication. To apply for this position, please send your application as one single PDF file. The application should contain a motivation letter, CV, grade sheets and two reference contacts.

Eligibility criteria: According to European legislation the candidate should not have spent more than 12 months in France in the three years preceding the start of the PhD fellowship.

Starting date: anytime until June 2016

Salary: 3 year European PhD fellowship with a highly attractive salary (>2000 € net)

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Web-link: <http://neel.cnrs.fr/spip.php?rubrique50>

SAWtrain Network: <http://www.sawtrain.eu/>