

Post-doc in quantum electrical metrology - 36 months M/F

36 month temporary position - Post Doc

Location : St Quentin-en-Yvelines (Trappes / France)

Reference : ML/MEQ/DMSI

LNE:

Leader in the development of measurement technics and references, with a strong reputation in France and abroad as National Metrology Institute, the Laboratoire National de Métrologie et d'Essais (LNE) supports industrial innovation and is a key player in making the economy more competitive and society safer through reliable and harmonized measurements.

As the driving force behind French metrology, our research lies at the heart of our public service mission, and is a fundamental factor in supporting the academic world and the competitiveness of companies, through ever more reliable measurements on innovative subjects such as artificial intelligence, nanotechnologies and quantum technologies.

Context:

One of the main current challenges in quantum electrical metrology is to simplify the operating conditions of quantum electrical standards, in order to make the International System of Units (SI) more accessible to industrial end-users. As part of the Horizon Europe FLATS "Flat bands for quantum metrology" project, LNE and its partners are seeking to exploit the high potential of *Twistronics*, using graphene-based van der Waals heterostructures with twist angle control, to develop new quantum electrical standards and ultra-sensitive detectors (SQUID, single electron and single photon). The ultimate aim is to combine and integrate them in a single "quantum multimeter" to progress towards self-referenced on-chip quantum sensors.

Missions:

Working in LNE's fundamental electrical metrology department, you will contribute to research activities in the field of quantum electrical metrology. Your main missions are as follows:

- Exploit and validate the strong potential of heterostructures based on graphene and hexagonal boron nitride (h-BN) at the so-called "magic angle" (MATBG, for "magic angle twisted bilayer graphene"). This validation for metrology applications will involve quantum transport and ultra-low noise and high-accuracy electrical measurements, in the Josephson effect and quantum anomalous Hall effect regimes, i.e. at (very) low temperature and possibly under a magnetic field;
- Contribute to the engineering of these standards and detectors (design, modeling, etc.) and to the engineering of the associated instrumentation (particularly cryogenic) for simplified operation of these new standards and detectors;
- Analyze the data thus obtained, in conjunction with existing theoretical models;
- Ensure reporting, in particular to the European partners in the project consortium, and promote the results through scientific communications, good practice guides, and potentially through actions aimed at industrializing the technologies developed, with the filing of patents for example.

Profile:

You hold a PhD degree in condensed matter physics, mesoscopic physics/quantum transport and/or quantum physics, and have strong experience in low-noise electronic transport measurements at (very) low temperatures. You have a keen interest in experimental science, measurement, instrumentation and technological and applied research.

Knowledge of quantum effects: Josephson effect and quantum Hall effect, is required. Specific knowledge of graphene physics would be highly appreciated.

You are able to analyze results and synthesize information. Pragmatic by nature, you are rigorous, critical and self-reliant. You enjoy teamwork, and are able to organize yourself to take part in several projects (at LNE and in European projects).

Fluency in scientific English is essential for the promotion of work (writing articles, conferences, meetings, etc.) and collaboration with the project's European partners.

Occasional travel is required for scientific exchanges necessary to the mission (project meetings with European partners, international conferences, etc.) in Paris suburb, France, Europe and Internationally.

Joining LNE means:

- ✓ Joining an international group with nearly 1,000 employees.
- ✓ Participating in the development of a Public Industrial and Commercial Institution (French acronym EPIC) that has been serving society and citizens since 1901.
- ✓ Joining a company that supports local authorities and industry in meeting tomorrow's social and environmental challenges.
- ✓ Join a research organization involved in European and international projects.
- ✓ Join a company that places respect and fairness at the heart of its HR policies.
- ✓ Join a company that is committed to a CSR policy and has set up a sustainable mobility package.
- ✓ Join a company that offers personalized introduction and regular training.
- ✓ A 12-month fixed salary plus an annual end-of-year bonus*.
- ✓ Executive status with a 205-day fixed salary and numerous benefits.
- ✓ A profit-sharing bonus and an employee savings plan (PEE/PERCO) with matching contributions*.
- ✓ Possibility of teleworking in accordance with the company agreement in force.
- ✓ Mutual insurance* and provident scheme*.
- ✓ Access to the company restaurant directly on our Trappes site.
- ✓ Access to a wide choice of offers through our social and economic committee (CSE).

* under the conditions set out in the agreements and their amendments.

To apply, send your CV and covering letter to: recrut@lne.fr, quoting job reference ML/MEQ/DMSI in the subject line.