

Research Engineer M/F : Smart instrumentation for polarimetry and quantum state tomography

Location : [Center for Nanoscience and Nanotechnology](#), 10 Bd Thomas Gobert, Palaiseau

Duration of contrat : 12 months

Starting date : To be discussed (possibility to start soon)

Requested degree : PhD

Salary : Depending on experience (typically 2851,40€ gross salary /month, i.e. **2291,65€ net**, for a research engineer with 3 to 5 years of experience, including PhD thesis)

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Context & mission

The work will be carried out in the [Solid State Quantum Optics Group](#) of the Center for Nanoscience and Nanotechnology (C2N). Located at the heart of the Paris Saclay campus, C2N is a joint research unit of [CNRS](#), [Université Paris Saclay](#) and [Université Paris Cité](#). The mission is part of the valorization project SALTo (*Scalable & Automated Light polarization Tomography*), funded by the LabEx [PALM](#) and [NanoSaclay](#).

The selected applicant will be responsible for **developing smart devices for automated polarization control, applied both to classical and quantum states of light**. In particular, these devices will:

- Be self-calibrating through machine learning, within an experiment or application
- Adapt to various applications in the fields of optics, materials analysis, and classical or quantum communications
- Be compatible with photon routing and multi-photon quantum state tomography

The research engineer will be integrated in an international team, with the most recent know-how on the subject, and developing breakthrough technologies. He/she will be supervised and guided by the project leaders, who will help him/her to develop skills beyond his/her initial training. He/she will be included in the strategy for the valorization of results.

The selected applicant will also have the opportunity to benefit from CNRS training programs, on scientific and technical aspects as well as on project management and research valorization (intellectual property, innovation ecosystem, entrepreneurship...).

Activities

- Design, build, characterize and improve demonstrators of smart instruments for automated polarization control
- Program and optimize software, interfaces, and machine learning strategies, as well as their integration into "*plug & play*" systems
- Develop first applications in the classical or in the quantum regime
- Communicate and/or protect the results and the developed know-how
- Manage the project: organization & follow-up of the project's progress, reporting and discussion of results, animation of meetings & internal collaborations, supervision of trainees, etc.
- Ensure a technological watch (scientific publications and patents)

Requested profile

Core skills :

- Optical characterization & development of optical experiments and devices
- Instrumentation & interface development (software and hardware)
- Programming (especially Python) & automated data processing
- Project management

Profile :

- PhD or Research & Development Engineer with professional experience
- Proactive personality with a taste for initiative, autonomy and teamwork, as well as a strong potential to learn new techniques, software & hardware
- Strong interest in innovation and research valorization

Many other experiences and skills can be useful to the project, such as:

- Machine learning and/or optimization algorithms
- Electronics, circuit boards, microprocessors (Arduino, Raspberry Pi, ...)
- Ellipsometry, polarimetry, or quantum state tomography
- Valorization: intellectual property, industrial transfer, ...

Constraints and risks

In view of the perspectives for valorization and industrial transfer, the work will be subject to a declaration of confidentiality, some of the techniques used requiring intellectual protection prior to their communication.

Occasional use of class 3B to 4 lasers.

Contacts

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