Internship offer – Introduction to optical characterization of quantum nanodiamonds

Duration: 8 weeks, starting from late April 2026

This short-term internship aims to introduce the student to the field of **quantum nanodiamonds** and to the main **optical characterization techniques** used in physics and materials science. It is carried out within the framework of the **NanoG4V project** (PI M. De Feudis), funded by the French National Research Agency (ANR), which aims to produce a new generation of high-quality, quantum-grade nanodiamonds for a wide range of applications, such as extreme-condition sensing, nanoscale thermometry, and live-cell dual-color imaging. The student will join the **CQSD group of the MPOE team at the IRCP Institute**.

Keywords: Quantum nanodiamonds; Raman spectroscopy; photoluminescence (PL); scientific data processing.

Internship objectives:

The student will be trained in the study of nanodiamond samples using **Raman spectroscopy and photoluminescence (PL) at room temperature**, employing different laser wavelengths (green, red, blue). The measurements will allow the identification of **diamond and graphite phases**, as well as different **color centers**, such as silicon-vacancy (SiV) and nitrogen-vacancy (NV) centers, and the understanding of their spectroscopic signatures. The internship will include a strong experimental component: sample preparation and handling, hands-on use of a Raman/PL spectrometer (Renishaw software), understanding of the general operation of the instrumentation and its electronics. Particular attention will be devoted to **data processing and analysis**. The student will learn how to exploit experimental results using scientific software (Origin, etc.) to produce high-quality graphs, perform mathematical fitting procedures, and generate 3D representations. An introduction to data structuring and compatibility between different file formats (e.g. between Python and Origin) will also be provided. The internship will be supervised by the Ass. Prof. Mary De Feudis (project leader) and a PhD student, within an active and stimulating international research environment.

Perspectives:

For interested students, this internship may lead to higher-level internships, including the processing of data obtained at the SOLEIL synchrotron (tomography, radiography, X-ray diffraction).

Internship supervisor: Mary De Feudis (Associate Professor and PI of the NanoG4V project)
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Internship location: Institut de Recherche de Chimie Paris (Paris 75005), Chimie ParisTech, CNRS, PSL Université.

References:

[1] C. Becher, et al., Materials for Quantum Technology 3 (1) 2023, p. 012501.
[2] M. De Feudis, et al., Advanced Materials Interfaces 7 (2) 2019, p. 1901408.
[3] B. Vindolet, et al., Physical Review B 106 (21) 2022, p. 214109.