Laboratoire Sciences et Méthodes Séparatives
UR 3233
Université de Rouen Normandie
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76821 Mont-Saint-Aignan Cedex
https://labsms.univ-rouen.fr/
https://carnot-i2c.fr/

Postdoctoral Position (18 months)

NanoLin : Nanoparticle-assisted Laser Induced Nucleation and Time-Resolved Spectroscopy

Location: Université de Rouen Normandie, Mont-Saint-Aignan, France (primary location) with regular travel to Lille, France
Contract duration: 18 months
Starting date: May 2026

Project Description

This postdoctoral position is part of a collaborative research project between the **SMS Laboratory (UR 3233 Université de Rouen Normandie)** and the **LASIRE Laboratory (UMR8516 Université de Lille)** and is funded through the **Institute of Innovation and Chemistry Carnot - I2C-** scientific resourcing program.

The project focuses on the interactions between **laser beams, nanoparticles in suspension (chiral and achiral) and molecules in solutions**, using **time-resolved pump–probe spectroscopy**. The objective is to identify the physical mechanisms that promote or inhibit nucleation and to assess the relevance of LIN for chiral resolution and crystal phase control.

The project is planned over **18 months**, combining experimental development, advanced characterization, dynamic analysis, and data interpretation. To ensure efficient progress, a full-time postdoctoral researcher will be recruited for the entire project duration.

Scientific Environment

- **SMS Laboratory (Rouen):** expertise in LIN experiments, laser-driven crystallization, crystal design, chiral resolution and crystallization protocols. This laboratory will be the **primary host institution**.
- **LASIRE Laboratory (Lille):** expertise in ultrafast laser spectroscopy, pump–probe measurements, and analysis of transient thermal and mechanical effects in laser–matter interactions.

The postdoctoral researcher will be based at the **SMS Laboratory in Rouen**, with **regular short stays and experimental campaigns at the LASIRE Laboratory in Lille**.

Main Responsibilities

- Design and optimize crystallization protocols in solution for selected molecular systems.
- Perform LIN experiments with and without nanoparticles, including studies of laser polarization effects.
- Characterize chiral and achiral nanoparticles (size, shape, chirality, optical properties).
- Develop time-resolved pump–probe spectroscopy experiments to probe ultrafast dynamics in laser–solution interactions.
- Analyze crystallization outcomes (morphology, polymorphism, enantiomeric purity, reproducibility).
- Use complementary techniques such as UV–Vis, FTIR, Raman spectroscopy, X-ray diffraction, particle size analysis, optical microscopy, SEM, and thermal analysis.
- Contribute to data interpretation, physical modeling (field and heating effects), and cross-analysis between laboratories.
- Prepare scientific publications and participate in discussions on industrial transfer.

Candidate Profile

- PhD in Physical Chemistry, Chemical Physics, Optics, Materials Science, or a closely related field.
- Experimental background in at least one of the following areas:
    - Laser–matter interaction
    - Crystallization or nucleation phenomena
- Experience with nanoparticle characterization and/or spectroscopy is highly desirable.
- Ability to work in a collaborative, interdisciplinary environment.
- Good communication skills and proficiency in spoken and written English.

Contract details

- full-time postdoctoral appointment for a period of **18 months**, starting on **May 2026** (flexible).
- Salary: Based on current salary scale and candidate's experience (€32,000 gross per annum min)

Application Procedure

Applicants should submit:

- A detailed CV
- A cover letter describing research experience and motivation
- Contact information for at least two references

Applications should be sent to:

Dr Valérie DUPRAY – MCF HDR ***and*** ***Dr Clément BRANDEL - MCF***
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