Université Paris-Saclay
Centre de Nanosciences et de Nanotechnologies (C2N)
UMR 9001 CNRS
10 Boulevard Thomas Gobert
91120 Palaiseau, France

Title: Processing and Integration Technologies for Mini & Micro-LEDs
Position: M2 Internship, February – July 2026
The duration of the internship is expected to be between four and six months.
Contact: Dr. Maria Tchernycheva, e-mail: maria.tchernycheva@c2n.upsaclay.fr

Key words: Optoelectronics, Semiconductor Processing, Nanosciences, Clean Room, Fabrication, Device Characterization.

Candidate Profile: An **M2 student in Physics**, **Electrical Engineering or related discipline**. The student should possess a **strong knowledge of semiconductor physics** and optoelectronic devices. A genuine **interest in clean room-based experimental work** and previous experience with semiconductor processing will be a significant advantage.

Context

Mini and Micro-LEDs (m-μLEDs) are widely seen as the next generation of display technology, offering unparalleled brightness, contrast, and energy efficiency. However, their widespread adoption is currently limited by significant manufacturing challenges, particularly in the high-yield, large-scale processing and integration of microscopic LEDs.

This internship focuses on exploring the fundamental challenges of Micro-LED fabrication and integration. The project aims to combine hands-on fabrication and characterization of μLED test structures. This internship offers an opportunity to combine modeling with experimental work in a clean room environment, providing valuable experience in both simulation and fabrication of advanced optoelectronic devices.

The student will learn to fabricate and characterize devices using multiple techniques, including: Photoluminescence (PL) mapping, Electroluminescence (EL) probing, Optical Microscopy, and Scanning Electron Microscopy (SEM). The research will be conducted in collaboration with Valeo automobile enterprise in interaction with an on-going CIFRE PhD.

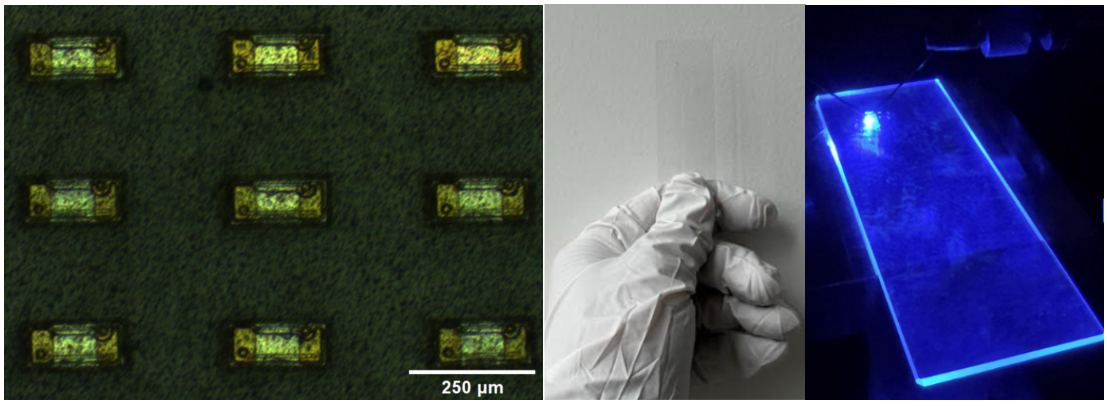
Tasks and Objectives

- Understand the working principles and fabrication challenges of m-µLEDs devices.
- Develop a process and identify key steps (e.g., mass transfer, electrical connections) that compromise device performance.
- Fabricate and characterize optimized test devices (PL, CL, EL, SEM).

Expected Outcomes

- **Advanced Expertise:** Developing a profound comprehension of Micro-LED processing and integration mechanisms.
- **Practical Simulation:** Gaining hands-on experience with semiconductor process and device simulation.
- **Clean Room Skills:** Acquiring practical competence in a clean room setting (e.g., lithography, etching, and deposition).
- **Characterization:** Learning various techniques for characterizing optoelectronic materials and devices.

a) b) c)



Example of a) Mini LEDs and fabricated device b) OFF c) ON