In Grenoble, capital of the french alps, LETI is an institute dedicated to applied research in micro- and nano-technologies, information technologies and technologies for healthcare. LETI is the privileged interface between industry and academia. Through research programs using worl-leading technology patforms, it ensures the development and industrial transfer of innovative technologies in a wide range of sectors.

Research Areas: materials science & technology, vibrational spectroscopy, characterization, TERS, TEPL, scanning probe microscopy.

Post-doctorat: Development and application of TERS/TEPL technique for advanced characterization of materials

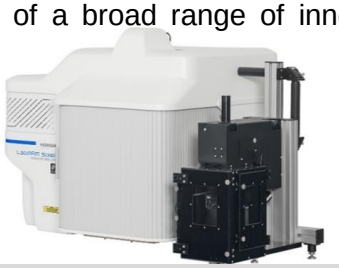
Context :

TERS/TEPL (Tip-Enhanced Raman Spectroscopy and Tip-Enhanced Photoluminescence) are powerful analytical techniques developed for nanoscale material characterization. The recent acquisition of a unique and versatile TERS/TEPL equipment at PFNC (Nano-characterization Platform) of CEA LETI opens up new horizons for materials characterization. This tool combines Raman spectroscopy, photoluminescence, and scanning probe microscopy. It features multi-wavelength capabilities (from UV to NIR), allowing a wide range of applications and providing unparalleled insights into the composition, structure, and mechanical/electrical properties of materials at nanoscale resolution. The current project aims to develop and accelerate the implementation of the TERS/TEPL techniques at PFNC to fully exploit its potential in diverse ongoing projects at CEA-Grenoble (LETI/LITEN/IRIG) and with its partners.

Description of work:

In this project, the post-doctoral researcher will be responsible for developing the tip-enhanced characterization protocol and optimizing experimental parameters (e.g. quantification of enhancement factor on model materials for different commercial and custom tips, laser excitation and AFM modes). Challenging applications of interest include nanoscale strain measurement in semiconductors and analysis of nanometric thin films (2D materials, polymers). Specific emphasis thus need to be placed on the study and evaluation of both local heating effects and photo-induced materials degradation under the tip. This is essential for rigorous interpretation of tip-enhanced spectra. In the specific case of luminescence in 2D materials heterostructures an in-depth analysis and understanding of TEPL enhancement mechanism is required.

The researcher will thus have the opportunity to develop the TERS & TEPL techniques on a unique multi-laser high luminosity tool for the nanoscale characterization of a broad range of innovative materials.



Candidate profile:

The ideal candidate should hold a Ph.D. in materials physics, spectroscopy, or a related field. Demonstrated experiences in TERS and TEPL techniques and advanced materials characterization are highly required. Skills in data analysis and spectroscopic interpretation are essential. The ability to work autonomously and collaborate with different research teams is also necessary.

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