

PhD position within the Laser-Matter interaction team

## Unravelling ultrafast heat transfer in glasses by direct mid-infrared probing of anharmonic vibrations

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**Duration:** 36 months

**Location:** Saint-Etienne, France

**Expected start date:** June/July 2025

### Description

The process of energy transfer to the matrix and its rapidity are key in designing material transformations. Both electronic and vibrational couplings contribute to the energy transfer from the quasi-free charge carriers and the atomic lattice. The objective is to reveal a competition between electronically-induced and collisional activation of vibration modes. The purpose is to observe energy transfer to the matrix under conditions of strong coupling by directly interrogating the material matrix, i.e. by time-resolved monitoring of individual vibrational signatures on ultrafast scales using dynamic mid-IR ultrafast spectroscopy. We propose a dynamic investigation into the fastest structural changes occurring in wide bandgap materials under strong field excitation, associated with vibrational activation, which is essential for increasing precision in ultrafast laser materials processing.

### Requirements

We are looking for candidates who meet the following criteria:

- MSc degree or equivalent in applied/experimental physics and/or related areas
- Analytic and experimental skills proven by MSc-work or work experience
- Background in nonlinear optics, material science and/or solid state physics
- Ability to develop a software infrastructure for data acquisition and processing
- Knowledge of the English language (oral and writing) and communications skills

The following additions would be a great asset:

- Expertise in glasses, defects and in ultrafast spectroscopy
- Knowledge of laser physics and optical alignments

### The Hubert Curien Laboratory and the Laser-Matter interaction team

The Hubert Curien Laboratory is a Joint Research Unit (UMR 5516) of the National Center for Scientific Research - CNRS and the Université Jean Monnet - UJM, located at 18 Rue Professor Benoît Lauras in Saint-Etienne, and administratively attached to the Faculty of Science and Technology of the UJM. The Laser-Matter interaction team of the laboratory has developed a recognized expertise in femtosecond laser processing for surface structuring, tailored laser beams and multiscale modeling of ultrafast dynamics. Additional information can be found on:

<https://laboratoirehubertcurien.univ-st-etienne.fr/en/teams/laser-matter-interaction.html>

## How to apply

Applicants should send the following documents directly to Dr. Vincenzo De Michele ([vincenzo.demichele@univ-st-etienne.fr](mailto:vincenzo.demichele@univ-st-etienne.fr)):

- A complete CV;
- A cover letter;
- A copy of a valid ID document (ID card, passport...)

## Deadline

Applications will be processed upon receipt, and applicants are encouraged to apply without delay.

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## Notes:

- Our research facility operating under a “Restricted Area” status, a security clearance for the successful candidate will be required prior to the beginning of his/her contract. Restricted Area security clearances are issued by the French Ministry of Higher Education and Scientific Research. The application will be filed by our services, upon receipt of specific information requested from the successful candidate.
- All employment at the Hubert Curien Laboratory is decided on the sole basis of qualifications, competence, integrity and organizational need. All are encouraged to apply to job openings regardless of their origin, identity, health, beliefs and orientations.