

Postdoc Position

Modeling of nonlinear propagation of ultrafast laser pulses inside semiconductors

A postdoctoral position is available for up to 2 years at Laboratoire Hubert Curien (LabHC) in Saint-Étienne, France. The postdoc will work in the framework of the international project funded by French National Research Agency in collaboration with the Institute of Applied Physics, Jena, Germany. LabHC is jointly run by the CNRS (The French National Center for Scientific Research) and Jean Monnet University.

Objectives: The objective of the postdoc project is to develop a computationally efficient model of a femtosecond laser pulse propagation inside semiconductors such as Si and GaAs. It will be then used to plan and interpret experiments on laser energy deposition in the volume of semiconductors, performed in Germany. The final goal is to better understand and optimize the highly-precise three-dimensional modification of semiconductors, widely used in micro-electronics industry.

Research program:

- *Semiconductor Bloch Equations (SBE)* will be used to model electron excitation and relaxation processes after the interaction with an ultrafast infrared laser pulse.
- *Unidirectional Pulse Propagation Equation (UPPE)* will be coupled with SBE to describe the nonlinear propagation and estimate the absorbed laser energy.

Keywords: SBE, UPPE, nonlinear optics, ultrafast laser pulse, semiconductors, simulation, theory

Qualifications: The candidate should hold a PhD in physics or closely related field. The candidate must have academic records/publications in the field of laser-matter interaction and nonlinear optics. Additional programming skills (Python, Fortran, Matlab, Julia, etc.) are requested.

Start date: as soon as possible

Salary conditions: monthly net salary 2000-2500€ depending on experience and skills.

How to apply: Interested candidate should send a CV and a short cover letter to:

Dr. Elena Kachan (elena.kachan@univ-st-etienne.fr)