Announcement of post-doc position available at LSPM

Proposal : PIC-MCC simulation of the dynamics of a two-dimensional electron gas confined in a quantum well semi-conductor.

The present proposal is related to a research project linked to the development of THz devices. This relies on the excitation of a very dense electron cloud confined in a quantum well. The plasma frequency of this cloud is in the THz regime, thus making it possible to generate emission in this frequency domain. The infrared optical response of a two-dimensional electron gas confined in a semiconductor quantum well is a collective phenomenon that may be approached using classical plasma physics approach. The objective of this proposal is to investigate the plasma oscillation dynamics for an electron cloud confined in a quantum well semi conductor. For this purpose, a simulation approach based on the use of particle-in-cell/Monte Carlo Collision (PIC/MCC) technique will be used. First an existing PIC-MCC simulation code will be adapted to the investigated situation, i.e., high density, mobile electron with a dynamic driven by elastic collision with the lattice atoms and a self consistent field forces. Then extensive simulation will be performed to investigate how the plasma dynamic change with the excitation techniques, i.e., thermal excitation, pulsed voltage/current excitation, etc. The purpose here is to identify an optimal excitation techniques that allows for an optimize THz emission. Eventually, the effect of a static magnetic field on the plasma dynamic will be studied in order to see if an additional confinement may lead to an improved emission.

The present proposal is supported by the Laboratoire d'excellence "Science and Engineering of Advance Materials and systems" (SEAM). The research project takes place in the context of a collaboration between the Laboratoire des Sciences des Procédés et des Matériaux (LSPM, plasma group) and the Laboratoire Matériaux et Phénomènes Quantiques (MPQ, condensed matter physics). The post-doc will work at the LSPM in close collaboration with the group of MPQ.

We seek applicants with a background in plasma physics, preferably an expertise in computational plasma physics. Some exposure to high performance computing will be appreciated

Post-doc duration: 12 months

Period : 01 September 2018-31 August 2019

Gross salary : 2600 € (2100 € net) based on the experience.

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