

Post-doctoral position: Near-field radiation (H/F)

Informations générales

Référence : UMR5008-SEVGOM-017

Lieu de travail: Villeurbanne

Date de publication : vendredi 16 janvier 2015

Type de contrat : CDD Scientifique

Durée du contrat : 12 mois

Date d'embauche prévue : 9 février 2015

Quotité de travail: Temps complet

Niveau d'études souhaité : Doctorat

Expérience souhaitée : 1 à 3 années

Rémunération : between 2500 € and 2670 per month (gross salary)

Missions

Scanning thermal microscopy (SThM) is a technique based on atomic force microscopy (AFM) that aims at measuring temperature and thermal properties at an ultralocal scale, with nanometer-scale spatial resolution. The field of application is the study of nanomaterials and micro and nanosystems and devices.

Analysis of the measurement data is often difficult because the thermal properties to be determined with this technique depend on the ability to properly describe heat transfer between the probe and the samples, as a function of the probe geometry and structure of the investigated sample. It is thus required to use the adequate models to describe these thermal fluxes.

The goal of this work is to provide:

- an evaluation of the radiative contributions to the heat flux exchanged between various SThM probes and samples,
- the relative contributions of the modes (propagative, evanescent), and comparatively to the other types of heat transfer modes (conductive, convective, depending on measurement conditions),
- a preliminary analysis aimed at better understanding the transition from radiation to conduction close to the atomic contact.

Activités

With the help of the currently-available tools at CETHIL and of its prior experience, the post-doctoral researcher will develop methods to simulate radiative heat transfer between a sharp object (probe-like with micrometer or nanometer tip radius) and another object having a planar interface, from the far-field to the near-field regimes, using various approaches:

- analytical whenever the geometries allow it,
- numerical using existing unlicensed codes or through collaborations.

Compétences

- PhD, preferably on thermal radiation at sub-wavelength scales,
- Experience in simulations and theory of electromagnetic radiation,
- Mobility : the post-doctoral researcher may need to travel to various meetings or to partners' location,
- Mastering french would be a plus.

Contexte de travail

The Centre for Energy and Thermal Sciences, Lyon, France (CETHIL) opens a position of post-doctoral researcher for the area of nanoscale heat transfer.

This work will be performed in the frame of the european collaborative project 'QUANTIHEAT' financed by FP7, which gathers the strengths of 20 partners on the topic of scanning thermal microscopy and its applications.