

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...) :

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

The 'Micro and Nanoscale Heat Transfer' (MiNT) group at CETHIL consists usually of 15 members, including 5 permanent researchers, who investigate thermal transport in nanostructured systems and interfaces. Among the main interests: nanoscale energy management and applications such as thermophotovoltaics, thermoelectrics and thermomechanics. The project will involve Prof. Olivier MERCHIER and Dr P-Olivier CHAPUIS.

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD **Topic # (see list) :**

Title :

Subject :

The control of heat transfer is key to many applications of the 21st century, especially if one wants to reduce the global energy consumption or at least limits its increase. Energy harvesting devices are one way to avoid heat losses. In addition, heating is detrimental to nanoelectronics as device performances decrease when temperature increases and passive ways of cooling are being investigated. Thermal radiation is a ubiquitous heat transfer channel, that requires to be managed in both cases. It happens that thermal radiation behaves in a very different way at the nanoscale than at macroscopic scale. Usual Planck's law and Stefan-Boltzmann's law cannot be applied anymore and calculation of thermal radiation of nanoscale objects/macroscopic objects separated by nanoscale distances requires electromagnetic means. This provides interesting opportunities for both energy-harvesting devices such as thermophotovoltaic ones or for thermal management of micro and nanodevices such as those involved in MEMS. The current topic will consist in designing original devices for those two applications by considering shapes, materials, and thermal conditions (temperature, optical properties). Numerical work will be compared with experiments realized in-house at the Centre for Energy and Thermal Sciences (CETHIL).

Keywords :

Expected collaborations :

Background required from the applicant :

Existence of a PDF file detailing the proposal ("yes" or "no") :

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