# Post-doctoral position opening

## Passive functionalized thermal emitter based on metal-insulator transition composite materials

Thermal management is a ubiquitous concern in current complex engineered systems. Increasing power and component density in electronic devices requires more and more sophisticated solutions relying on advanced materials and structures. Managing the heat generated in solid materials is thus a challenging problem for the development of numerous technologies (microelectronics, energy conversion systems, building thermal control, spacecraft thermal control,…). When some components are exposed to high temperatures, their functionality, efficiency, operating speed, reliability and lifetime can be severely impacted. Thermal management is also a major concern in the field of energy. Buildings and energy-conversion systems (such as solar panels) are also in demand of innovative solutions to address thermal control in the current global challenge context of energy efficiency.

One way to control temperature of objects is to act on the radiative properties of their surfaces. The control of the surface emissivity is a way to enhance or suppress heat exchanges by radiation with the surrounding environment, therefore enabling temperature control. Phase-transition materials can be used to passively control these properties though temperature changes. Vanadium dioxide is one of such materials. It undergoes a reversible structural phase transition at low temperature ($T_C$ = 68°C) associated with drastic changes of both electrical and optical properties.

Within this project, we propose to further extend the possibilities of functionalized surfaces based on phase-transition materials. The objective is to be able to control with composite structures made with phase change materials (PCMs) both the emission pattern and its spectrum.

The recruited student will make simulations of thermal emission of PCMs based meta-structures. We are looking for a student with a Ph.D. in Physics or Mechanical Engineering with an expertise in electrodynamics or radiative heat transfer. Experience with high-performance computing in C or Fortran would be appreciated.

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**Duration**: 1 year with a possible extension

**Funding**: ANR project PassiveHeat