

Seminar

Layered thermal metamaterials for the efficient directing, harvesting, and dissipation of heat

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A significant contributor to energy wastage is the inevitable generation as well as the uneven dissipation of heat. Practical methods to adeptly channel heat flux would have many applications enabling improved energy utilization and thermal energy management. The aim of this talk would be to review the use of relatively large-scale thermal metamaterials for thermal energy harness. A larger scientific objective is to describe thermal energy transfer (involving conduction, convection, as well as radiation) on a unified basis, which may be provided through a metamaterials type description.

Thermal metamaterials will be described through a study of the underlying phenomena related to heat flux manipulation, exploiting the anisotropy of the thermal conductivity tensor. The notion of the assembled metamaterial as an effective thermal medium forms the basis for many of the investigations. An overarching aim is to implement in such thermal metamaterials, functionalities well known from light optics, such as thermal refraction, which in turn may yield novel applications, such as thermal lensing. Consequently, the harness - through the controlled manipulation of the directionality of the heat flux and efficient dissipation of heat - through a metamaterial based perfect diffuser which are for example, of much importance in energy conservation and improving electrical device performance, may be accomplished.

Friday, Aug 17th 2018

4:00 PM (Tea/Coffee at 03:30 PM)

Auditorium, TIFR-H