



Ciclo di Lezioni

Il Dr. Riccardo Messina del Laboratoire Charles Fabry (CNRS e Université Paris-Saclay), Palaiseau, France, nell'ambito del progetto di Cooperazione Internazionale CoRI 2023 dell'Università degli Studi di Palermo, terrà presso il Dipartimento di Fisica e Chimica – E. Segrè, Via Archirafi 36, il seguente ciclo di lezioni/seminari su tematiche relative a *Introduction to near-field radiative heat transfer*.

Abstract

Radiative heat transfer is the phenomenon through which two bodies at different temperatures can exchange energy even when separated by vacuum. A milestone in the study of this effect, dating back to the 19th century, is Stefan–Boltzmann's law, setting an upper bound for the flux two bodies, realized in the ideal scenario of two blackbodies. A second breakthrough in the study of radiative heat transfer was set much later, in the 1970s, with the development of fluctuational electrodynamics. This theory demonstrated the possibility of exceeding the blackbody limit by several orders of magnitude in near-field regime, i.e. for separation distances in the microns and nanometer range. This discovery paved the way to several experimental investigations along with numerous applications, such as e.g. near-field thermophotovoltaic energy conversion and heat-assisted magnetic recording. I will review the foundations of fluctuational electrodynamics by focusing on the main theoretical tools beneath this framework (fluctuation-dissipation theorem and Green's functions). I will also discuss some potential applications and give an overview of the impact of geometry, material properties and coupling between radiative heat transfer and other heat-transport channels.

Calendario delle lezioni:

- I. Introduction to near-field radiative heat transfer (22 ottobre Aula D 15:00-17:00)
- II. Near-field radiative heat transfer in nanoparticle systems (24 ottobre Aula D 15:00-17:00)
- III. Impact of material properties on near-field radiative heat transfer (28 ottobre Aula D 15:00-17:00)
- IV. Coupling between near-field radiative heat transfer and conduction (29 ottobre Aula D 15:00-17:00)
- V. Heat transfer in the extreme near-field regime (31 ottobre Aula D 15:00-17:00)

Le lezioni sono rivolte primariamente agli studenti della Laurea Magistrale in Fisica e agli allievi del Dottorato di Ricerca in Scienze Fisiche e Chimiche, ma sono di interesse anche per tutti gli studenti, dottorandi, borsisti, assegnisti e docenti interessati alle relative tematiche di ricerca. Al termine di ogni seminario, il Dr. Messina sarà disponibile per eventuali domande e discussioni sugli argomenti trattati.

Lucia Rizzuto