

Ciclo di Lezioni

Il Dr. Francesco Intravaia del Institut für Physik, Humboldt-Universität zu Berlin and Max-Born-Institut, Berlin, Germany, 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 *Fluctuation-induced Phenomena, Casimir Interactions, Quantum Electrodynamics*.

Abstract

Fluctuations are omnipresent in both the classical and the quantum worlds and they are connected with a panoply of phenomena in different areas of physics ranging from biophysics to gravity, from chemistry to cosmology. They play a key role in fundamental processes like decoherence, thermal transport, and interactions between atoms or molecules (van der Waals forces) and extended bodies (Casimir effect). These phenomena govern biological processes and are relevant for colloidal matter, cell membranes, proteins and, in general, the structure of molecules and solids. Their exact understanding is rapidly becoming important for the characterization of modern experimental set-ups and the development of future quantum technologies.

The study of fluctuation-induced phenomena is intrinsically multidisciplinary and touches upon a wide range of topics, including quantum electrodynamics, statistical mechanics and condensed matter physics. In this series of lectures I will review some aspects of the physics behind these phenomena, prevalently focusing on those induced by the electromagnetic quantum fluctuations.

Calendario delle lezioni:

1. ***Introduction: Quantum fluctuations, zero-point energy and the Casimir effect in its original formulation*** (Martedì 24-09-2024, 16.00 - 18.00, Aula D).
2. ***Some relevant theoretical aspects regarding the descriptions of fluctuations in (open) quantum systems*** (Giovedì 26-09-2024, Aula B, 15.00 - 17.00, Aula B).
3. ***Lifshitz theory of equilibrium fluctuation-induced atom-surface and plane-plane interactions: A different perspective on Casimir forces*** (Venerdì 27-09-2024, 15.00 - 17.00, Aula E)
4. ***Modern approaches addressing the physics of Casimir interactions: An experimental and theoretical overview*** (Martedì 01-10-2024, 15.00 - 17.00, Aula A).
5. ***Going beyond equilibrium: Examples of nonequilibrium Casimir interactions*** (Giovedì 03-10-2024, 15.00 - 17.00, Aula B).
6. ***On the physics of the contactless atom-surface (quantum) friction*** (Venerdì 04-10-2024, 11.30 - 13.30, Aula B).

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. Intravaia sarà disponibile per eventuali domande e discussioni sugli argomenti trattati.

Roberto Passante