Light-Matter Interaction at the Nanoscale: From Quantum Dots to 2D Materials

13 de junho de 2024, às 14:00 (horário de Brasília), Prof. Dr. Euclydes Marega Junior, Centro de Ótica e Fotônica, Instituto de Física de Sao Carlos - USP - Brasil

por **George Balster Martins**

Publicado: 10/06/2024 - 06:48

Última modificação: 10/06/2024 - 06:48

Light-matter interaction at the Nanoscale is a captivating field that delves into the intricate interplay between photons and nanoscale materials. At this scale, matter exhibits unique properties, and light behaves in ways that diverge from macroscale observations. This dynamic interaction underpins applications like nanophotonics, optoelectronics, quantum technologies, and beyond, driving advances in sensing, imaging, and communication. Nanoscale materials, such as semiconductor quantum dots and 2D materials, possess dimensions comparable to or smaller than the wavelength of light. Consequently, they can manipulate light at a fundamental level, leading to phenomena like plasmonics, excitonics, and quantum confinement effects. Plasmonics, for instance, involves the collective oscillation of free electrons in metallic nanostructures when stimulated by light, enabling unprecedented control over light localization and enhancement at the Nanoscale. In this talk, we will present the results of the interaction of semiconductor quantum dots and two-dimensional semiconductor materials with electromagnetic fields confined in metallic nanostructures, the effects that can be observed in this, and its possible applications.