

SEMINAR SERIES

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When free electrons meet light: Quantum interactions at the nanoscale

Abstract: At the intersection of electron microscopy and attosecond science, ultrafast electron microscopy has emerged as a research frontier aiming to investigate material excitations with an unprecedented combination of spatiotemporal resolution, while also granting us access to quantum phenomena involving photonic nanostructures. In this context, we will discuss the fundamental principles governing the interactions between free electrons, light, and photonic media, with an emphasis on exploring quantum aspects that include electron decoherence caused by coupling to radiative modes, the generation of quantum states of light, and new approaches for quantum sensing and metrology, highlighting the unique characteristics of free electron–light interactions that enable access to previously unexplored physics.

Bio: Javier García de Abajo is an ICREA Research Professor and leader of the Nanophotonics Theory Group at ICFO–Institut de Ciències Fotoniques in Barcelona. His interests include electron microscopy, light-matter interactions, quantum optics, condensed matter physics, ultrafast phenomena, and nanophotonics. His group applies theoretical and computational techniques to investigate new phenomena and explore their potential application in microscopy, sensing, and information processing. He has co-authored 450+ papers cited 70,000+ times with an h index of 128 (Google Scholar, Feb. 2025). He is a Fellow of the American Physical Society, the Optical Society of America, and the Electromagnetic Academy.



**JAVIER GARCIA DE
ABAJO**

ICREA, Catalan Institution for
Research and Advanced Studies

Date:

Thursday February 19, 2026

Time:

11:00am – 12:00pm

Location:

ASRC Auditorium
85 Saint Nicholas Terrace
New York, NY 10031

Host:

Andrea Alù, Director, Photonics
Initiative, ASRC, CUNY GC

Zoom Meeting ID894 3655 9130
Passcode 952358

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