

SPECIAL GUEST LECTURE

DRIVEN QUANTUM MATERIALS

SEMINAR AND Q&A WITH **ANDREA CAVALLERI**



Andrea Cavalleri is the founding director of the Max Planck Institute for the Structure and Dynamics of Matter in Hamburg (Germany) and a professor of Physics at the University of Oxford (UK). He received a PhD in electrical engineering from the University of Pavia (Italy) and held postgraduate and research staff positions at the University of California San Diego, and at the Lawrence Berkeley National Laboratory. He joined the Oxford faculty in 2005, was promoted to Professor of Physics in 2006 and joined the Max Planck Society in 2008.

MAX PLANCK INSTITUTE FOR THE STRUCTURE AND DYNAMICS OF MATTER, HAMBURG GERMANY

DEPARTMENT OF PHYSICS, UNIVERSITY OF OXFORD

I will discuss how coherent electromagnetic radiation, when tuned to collective modes in quantum materials, can be used to induce unexpected dynamical phases. The core idea is that when uncoupled normal modes are driven nonlinearly, these start interacting, creating complex correlation that are absent in equilibrium. interactions that are subdominant in equilibrium. Nonlinear phononics/magnonics/plasmonics takes inspiration from nonlinear optics to coherently control materials function. Potential applications to memory energy devices will be discussed.

MONDAY, SEPTEMBER 22, 2025 11:00 A.M. - 12:15 P.M.
BRK 1001

[HTTPS://PURDUE-EDU.ZOOM.US/J/97252612289](https://PURDUE-EDU.ZOOM.US/J/97252612289)



Birck Nanotechnology Center
Elmore Family School of Electrical and Computer Engineering
Purdue Quantum Science and Engineering Institute