

Evento organizzato nell'ambito di Engineering  
Physics Colloquia



Università  
Ca' Foscari  
Venezia

Dipartimento di  
Scienze Molecolari  
e Nanosistemi

# Probing materials with strong THz light pulses: a theory perspective on experimental challenges

**20 novembre 2024**, ore 11.00

Conference Room Orio Zanetto, Alfa Building

Sarà possibile seguire il seminario anche da remoto, collegandosi al seguente link: <https://unive.zoom.us/j/89787327126> | Password: seminar1

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The recent experimental advances in generating intense and short-lived THz light pulses opened the way for a plethora of potential ground-breaking applications. Indeed, the THz spectral window corresponds to the timescale of several collective excitations in solids, ranging from lattice vibrations to collective modes of the electron system across a phase transitions, like e.g the superconducting one. From the theoretical point of view, facing with time-resolved spectroscopy with intense THz light pulses requires to address simultaneously two complementary problems: going beyond the linear-response regime, valid for weak perturbing fields, and describing a purely out-of-equilibrium process, where

one probes relaxation out of a (possible) metastable state. While addressing the latter problem is still at its infancy, in the last decade several progresses have been done on the former aspect. In this talk I will review our contribution to the understanding of resonant and non-resonant excitations driven by strong THz fields in solids, with examples ranging from superconducting to lattice modes. I will show how a common theoretical framework can be efficiently used to interpret several experimental findings, making non-linear THz spectroscopy an extremely versatile tool to disentangle the microscopic processes at play in different systems.

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