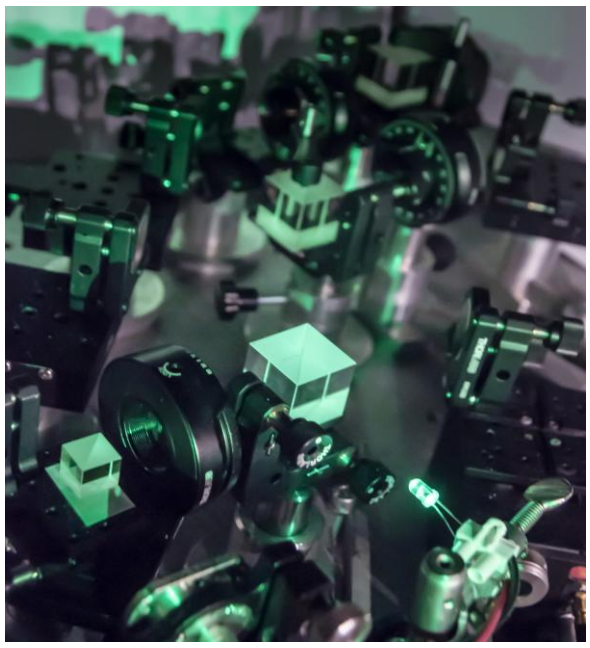
Q@TN Seminar



Prof. Claudio Giannetti

Dipartimento di Matematica e Fisica 'Niccolò Tartaglia', UCSC Brescia

Quantum materials in a new ultrafast light: towards quantum coherent operations at ambient temperature

February 05, 2026 – h 14:00

Aula A208 – Povo 1 – Via Sommarive n. 5

Abstract:

Controlling electronic quantum coherence in solids at ambient conditions is a long-sought target in condensed matter physics. Unfortunately, the quantum-coherent nature of electronic excitations in materials is usually washed out on extremely fast timescales as a consequence of interactions with incoherent fluctuations in the environment. Current quantum computing technology is therefore based on superconducting devices operating at extremely low temperatures (<20 mK) to preserve the quantum properties for the timescales necessary to measure the output of logic operations.

In this talk, we will present and discuss strategies to control the insulator-to-metal transition in Mott materials, with specific focus on the paradigmatic Mott insulator V2O3. We will emphasize the current attempts in controlling the Mott switching dynamics via the application of external voltage and electromagnetic pulses and we will address the possibility of achieving quantum coherent control of the transition dynamics. The possibility of implementing ultrafast quantum logic operations at ambient temperature will be discussed.

Contacts:
Staff Dipartimento di Fisica
0461 28-1219-1504-1575-2042
info.qtn@unitn.it

Scientific Coordinator:
Dott. Alberto Biella
Prof. Iacopo Carusotto

with the financial support of