FACOLTÀ DI SCIENZE MATEMATICHE, FISICHE E NATURALI
DIPARTIMENTO DI MATEMATICA E FISICA "NICCOLÒ TARTAGLIA"
INTERNATIONAL DOCTORAL PROGRAM IN SCIENCE

# Emergent phenomena and coherence in Strongly Correlated Materials

*Introducono:*

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*Interviene:*

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*Abstract*

When the interactions between the valence electrons are so strong to induce phenomena which can not be described in a single-electron picture, we are dealing with a strongly correlated system. The interest in strongly correlated materials is not merely theoretical, but it descends from the variety of spectacular phenomena they display, among which high-temperature superconductivity is only the tip of an iceberg which an expanding community is exploring.
In the first part of the talk I will discuss the basic physics of correlated materials, highlighting the coexistence of coherent excitations and almost incoherent "insulating like" excitations and the effects of this dual behavior on coherence properties and in the decay of excitations.
In the second part of the talk I will discuss the possibility to control the electronic properties, including the decoherence through material design of heterostructures. Oxide heterostructures allow for highly tunable electronic properties which can be used to optimize functional properties including the decoherence.
I will present some experimental results and theoretical proposals to give a flavor of the richness of potential applications of these systems.

## Seminario

**Venerdì 5 maggio 2017**
**Sala Riunioni, ore 12.00**
Via dei Musei 41 - Brescia

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