

LNGS SEMINAR SERIES

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Unexpected effects from long-range interactions

The theoretical study and recent experimental realization of long-range interacting systems unveiled new striking phenomena, overcoming usual paradigms of the short-range physics.

In my talk I exploit a simple long-range generalization of the common Ising model in a transverse field to illustrate some of these phenomena, as:

- i) the occurrence of nonlocal effects, like the lack of a maximum propagation velocity for a signal or the algebraic decay for correlation functions in gapped regimes,
- ii) the breakdown of conformal symmetry for continuous critical points,
- iii) the appearance of continuous phase transitions with nonvanishing mass gap, leading to new phases and new edge excitations,
- iv) the necessity to consider non standard decoupling hierarchies in the RG approaches.

In spite of the simplicity of the assumed toy-model, the described properties are inferred to be general for long-range systems.

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