



**Conference on Long-Range Interacting Many-Body Systems:
from Atomic to Astrophysical Scales
(25 - 29 July 2016)**

Venue: ICTP Leonardo da Vinci Building - Budinich Lecture Hall
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Title:

Locality in long-range interacting quantum systems

Speaker:

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Abstract:

For more than a decade, ultracold atomic and molecular systems have been exploited to simulate canonical models of strongly correlated materials. However, the extremely low (often sub nano-kelvin) temperatures required to realize the most interesting equilibrium behaviors of such models, including quantum magnetism and high-temperature superconductivity, have proven extremely difficult to achieve. When these ultracold systems are driven far-from equilibrium, however, very small temperatures get traded in for very long time-scales, which enable the observation of dynamic phenomena that were never even envisioned in the context of real materials. In this talk, I will review some recent experimental and theoretical explorations of non-equilibrium dynamics in ultracold atomic systems, and will discuss some of the interesting questions that arise naturally from their remarkable tunability. In particular, I will describe recent efforts to understand the fate of locality --- i.e. constraints on the propagation of information/entanglement --- as interactions become increasingly long-ranged.