



# UNIVERSITÀ DI PARMA

Dipartimento di Scienze Matematiche, Fisiche ed Informatiche - DSMFI

SEMINARIO DI DIPARTIMENTO

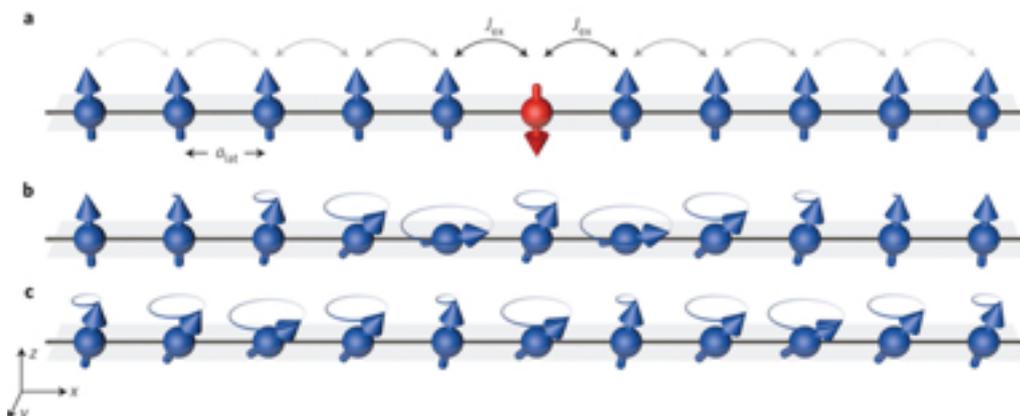
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## **DISENTANGLING STRONGLY CORRELATED QUANTUM SYSTEMS**

### **Abstract:**

Strongly correlated quantum systems, where more traditional methods of quantum many-body physics fail, have attracted enormous attention over the last decades but still provide formidable problems for our understanding: high- $T_c$  superconductors, frustrated quantum magnets, transition metal oxide and rare earth materials, ultracold atomic gases in optical lattices. Key numerical advances have been made using so-called tensor network methods, the best known of which is the density matrix renormalization group (DMRG). After an introduction into the methodology, I want to present selected results from areas which in my view present particularly interesting challenges also in the future: non-equilibrium dynamics of correlated systems (here: ultracold atoms in lattices) and material properties of three-dimensional transition metal oxides.



Giovedì 20 aprile – ore 16:00  
Aula Newton – Plesso Fisico