ICFO



INSIGHT SEMINAR: Quantum simulation of string breaking dynamics

FEDERICA SURACE

January 16, 2025
12:00 to 13:00
Elements Room

ABSTRACT:

In confining theories, separating two charges results in the generation of new charges that screen the original ones. This process, known as "string breaking", prevents isolation of individual charges and is one of the fundamental phenomena in gauge theories such as quantum chromodynamics, as well as in simpler models exhibiting confinement. In this talk, will focus on the dynamics of string breaking in a trapped-ion quantum simulator. Th breaking is observed as the string tension is gradually increased over time. As the syste dynamically crosses the string-breaking point, becoming unstable, we demonstrate an characterize the nucleation of "bubbles" that break the string.

BIO:

Federica Surace is an AWS Quantum Postdoctoral Scholar at the California Institute o Technology, and a member of Caltech'sInstitute for Quantum Information and Matter. She received her PhD in 2021 from Scuola Internazionale Superiore di Studi Avanzati (SISSA). Sh works at the intersection of condensed matter physics and quantum information investigating the non-equilibrium dynamics of quantum many-body systems and th capabilities of quantum simulators

Quantum systems with many strongly interacting particles are difficult to study wi h traditional techniques: because of the large computational cost, numerical simulations a e typically limited to systems with a small number of components. A promising solution is o use other quantum systems ("quantum simulators"), that can be easily controlled in table-t p experiments, and tune their parameters to mimic the properties of the model that we want o study. Federica's research aims, in particular, at developing tools for simulating high-ene gy physics with quantum simulators and at understanding the emergence (or the absence) of thermodynamics and statistical mechanics in quantum many-body systems.

Hosted by: Prof. Dr. Leticia Tarruell