ICFO

QUANTUM SEMINAR: Entanglement of trapped-ion qubits separated by 230 meters

TRACY NORTHUP

March 21, 2023
12:00 to 13:00
Seminar Room

Entanglement-based quantum networks hold out the promise of new capabilities for secure communication, distributed quantum computing, and interconnected quantum sensors. However, only a handful of elementary quantum networks have been realized to date. I will present recent results from our prototype network, in which two calcium ions are entangled with one another over a distance of 230 m, via a 520 m optical fiber channel linking two buildings. The ion-ion entanglement is based on ion-photon entanglement mediated by coherent Raman processes in optical cavities. I will discuss the advantages of trapped ions for quantum networks and the role that cavities can play as quantum interfaces between light and matter at network nodes. After examining the key metrics for remote entanglement, we will consider the necessary steps to extend this work to long-distance networks of entangled quantum processors.

Short bio:
Tracy Northup is a professor of experimental physics at the University of Innsbruck, Austria.? Her research explores quantum interfaces between light and matter, focusing on trapped-io and cavity-based interfaces for quantum networks and quantum optomechanics.
Hosted by: Darrick Chang & Hugues de Riedmatten