ICFO

QUANTUM SEMINAR: The Sound of Quantum Mechanics

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12:00

Seminar Room

Abstract:

In the past decade a new technology domain of quantum sound has emerged. Unlike electrical and optical systems, which are governed by fundamental equations of electromagnetism, acoustical and vibrational phenomena are described by the equations of elastic waves in solid bodies. They are subject to different limitations and can reach different regimes of behavior. Sound is different. The speed of sound in a solid material is 100,000-fold slower than light, elastic waves do not propagate through vacuum, and they can couple to atom-like systems through strain rather than electrical or magnetic dipole interactions. These facts have consequences for quantum information science that we have yet to fully understand. In his talk, I will describe the emergence of this new branch of quantum science, showing both striking demonstrations of quantum sound and highlighting potential applications. In particular, I will demonstrate the dual wave-particle nature of phonons and discuss how quantum acoustics might be the key enabling technology for quantum communication networks.

Hosted by: Adrian Bachtold