

**IQ5: Mathieu Juan** (Université de Sherbrooke) 2h

"Quantum opto-mechanics et magneto-mechanics"

Optomechanics explores the interaction between light and the mechanical motion of micro- and nano-scale systems, bridging quantum optics and micromechanics. A typical setup features an optical cavity with one fixed and one mechanically responsive mirror. The motion of the mirror changes the cavity length, while the radiation pressure from photons within the cavity impacts the mirror's movement. This dynamic interplay lies at the heart of optomechanics and has been utilized for precision measurements and the quantum control of increasingly massive mechanical systems. In this lecture series, I will introduce the core principles of optomechanics, focusing on both optical and microwave systems, including implementations using superconducting circuits. I will also discuss key applications in precision measurement and quantum information processing. The goal is to equip participants with a solid understanding of optomechanics, its current challenges, and emerging opportunities in the field. The objective of the lecture is to provide a good understanding of optomechanics, its current challenges, and emerging opportunities in the field.