ID de Contribution: **295** Type: **Poster**

Tabletop squeezed light optomechanics with SiN phononic crystals

Interferometric measurements of mechanical displacements are nowadays limited by quantum noises both in gravitational interferometers and tabletop optomechanics experiments. These quantum noises are twofold: the Quantum Shot Noise (QSN) related to the laser's phase noise, and the Quantum Radiation Pressure Noise (QRPN) arising from the mechanical response to a fluctuating radiation pressure. Together, they enforce the so called Standard Quantum Limit (SQL), defined as the lowest achievable noise when measuring mechanical displacements. SubSQL displacements can however be observed using squeezed light. In the mean time, clean room technologies have also reached a point where macroscopic mechanical resonators can be engineered to exhibit quantum behaviours in cryogenic conditions. It is therefore of interest to probe broadband subSQL mechanical spectra at low temperature to investigate the interplay between classical and quantum physics at the mesoscopic scale.

Our project aims at measuring subSQL mechanical spectra of ng-scale Silicon Nitride phononic crystals (SiN PnC) by injecting squeezed light inside our optomechanical cavity. This light source must feature a frequency dependent squeezing angle as to minimise the QSN outside the resonator's bandwidth while simultaneously reducing the QRPN at resonance. We will present the squeezed light source built at LKB as well as the 300K characterisation of our optomechanical system.

Affiliation de l'auteur principal

Laboratoire Kastler Brossel

Auteur principal: JACQUET, Pierre-Edouard (Laboratoire Kastler Brossel)

Co-auteurs: Dr CROQUETTE, Michael (Laboratoire Kastler Brossel); COHADON, Pierre-François; Dr DELEGLISE, Samuel (Laboratoire Kastler Brossel); Dr CHUA, Sheon (Australian National University)

Orateur: JACQUET, Pierre-Edouard (Laboratoire Kastler Brossel)

Classification de Session: Session Poster 2: MC1, MC4, MC8, MC10, MC12, MC14, MC20, MC21, MC23, MC24, MC25, REDP

Classification de thématique: MC8 Dernières avancées dans le domaine des technologies quantiques