UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI FISICA
QUANTUM TECHNOLOGY LAB

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Aula Polvani (piano 1 LITA)

Edoardo Suerra

Università degli Studi di Milano

Generation of squeezed states via an actively stabilized optical cavity

Abstract:

Squeezed states are a particular class of quantum optical states with a fundamental property: for a certain phase their electric field fluctuates less than the vacuum state, which has zero photons. This feature finds applications in several fields of physics, spacing from quantum information to the gravitational waves detection.

Experimentally, the squeezing of a quantum optical state is achieved by the interaction between a laser source and a non-linear medium. In order to increase the efficiency of the process, a stabilized Fabry-Pérot optical cavity is required as it increases the interaction time between the light and the medium.

I will provide a description of the experimental setup used for squeezing generation, focusing on the active stabilization system of the optical cavity, which is based on the Pound-Drever-Hall technique. Then I will discuss an application of this apparatus for the study of the effect of the squeezing on phase-diffused coherent states.

For further info:
http://users.unimi.it/aqm/