Irfu
Institut de recherche
sur les lois fondamentales
de l'Univers

Séminaire SPP

Lundi 15/05/2017, 11h00-12h00

CEA-Saclay Bat 141, salle AndrÃ© Berthelot

Quantum optics with levitating diamonds

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Over the past decades, remarkable progress has been accomplished in the control of quantum systems and in their isolation from their surrounding environment. The 2013 Nobel Prize, awarded to Serge Haroche and David Wineland for their work on the control of individual quantum particles show the interest of the scientific community for this research. From a fundamental standpoint, the gap between the quantum and classical world is heavily studied theoretically and experimentally with the hope to answer important fundamental questions such as "what is the size/mass/temperature of the object up to which quantum effects disappear ? Is gravity the parameter that governs the transition from the micro to the macro world ?".

The recent developments in the field of optomechanics make it possible to cool heavy mechanical oscillators close to their ground state of motion and to perform pristine quantum optical experiments with objects containing billions of atoms and can answers some of these questions.

To go further, single quantum emitters embedded inside the mechanical oscillators have been studied, and have the potential to enlarge the scope of opto-mechanical studies.Â This hybrid platform can for intance open a path for observing quantum jumps of a mechanical oscillator. These platform will furthermore open opportunities for studying new fundamental phenomena in quantum optics and establish building blocks of future quantum-based technologies.

In this talk I will discuss the recent advances in this field, and present our original approach based on levitating diamond-based mechanical oscillators.

Le café sera servi 10 minutes avant.

NB : La présentation d'une pièce d'identité est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance Martine Oger, tél. 01 69 08 23 50, e-mail : `martine.oger@cea.fr`. (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).