INTERNAL CCQCN SEMINAR

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15:15-16:00

2nd Floor Seminar Room

Spectroscopic measurements of the Casimir-Polder interaction: theoretical implications

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Abstract

The Casimir-Polder interaction between atoms and surfaces is due to the modifications of the vacuum fluctuations by the presence of reflective boundary. It is of fundamental importance for understanding the electromagnetic and thermodynamic properties of matter. Casimir physics is also of interest for modern fundamental measurements of Non-Newtonian gravity and more applied sciences such as physical chemistry and nanotechnologies (MEMS/NEMS, atom chips).
Here, I will give an overview of the breakthroughs in Casimir-Polder experiments focusing on spectroscopic selective reflection measurements performed in Paris13. Contrary to most experimental techniques, spectroscopy allows the measurement of the Casimir-Polder effects for excited state atoms, which are particularly interesting because they can couple to surface waves (polaritons). This coupling has allowed the Paris13 group to demonstrate atom-surface repulsion and more recently the control of Casimir-Polder interactions via temperature (thermal excitation of surface waves)
I will also go through some recent spectroscopic experiments performed with atoms confined in nanostructures such as artificial opals (photonic crystals) or porous random media.