

Séminaire de Chimie Théorique

Salle conférences 3eme Est, Bat. A12
Jeudi 3 Octobre à 11:00

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Challenges @ ultracold temperatures

Reaching the cold ($T < 1$ K) and ultracold ($T < 1$ mK) regimes has triggered the revival of atomic and molecular physics. In less than two decades, it has led to the creation of Bose-Einstein condensates and Fermi degenerate gases, atom lasers, quantized vortices, solitons, and optical lattices. It has had a significant impact in high-precision measurement and in the study of collective phenomena such as superfluidity and superconductivity. It has opened up the possibility of full tunability and control of atomic interactions, scattering properties and chemical reactivity using external fields. Additionally, ultracold dipolar molecules are ideal building blocks to create Feynman's "quantum simulators", which will be a significant step towards the solution of long-standing problems in condensed-matter physics and the development of quantum technologies.

Among the main current goals in this field are the production, trapping and control of high-density samples of ultracold polar molecules. In this seminar, I will discuss various of the biggest challenges faced by specialists in quantum scattering calculations, spectroscopy, ab initio methods and statistical theories in helping several of the world's leading laboratories achieve these goals.

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