SEMINARIO
Departamentos de Física Teórica I y II
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CONFERENCIANTE: Robin Côté

Department of Physics, University of Connecticut

TITULO: Controlling ultracold chemical reactions via Rydberg-dressed interactions

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ABSTRACT:

In recent years, two sub-fields of ultracold physics have experienced rapid developments: ultracold molecules, and ultracold Rydberg physics. In this presentation, we marry both and show that ultracold chemical reactions can be manipulated and controlled by using Rydberg-dressed interactions. Scattering in the ultracold regime is sensitive to long-range interactions, especially when weakly bound (or quasi-bound) states exist near the collision threshold. We investigate how, by Rydberg-dressing a reactant, one enhances its polarizability and modifies the long-range van der Waals collision complex, which can alter chemical reaction rates by shifting the position of near threshold bound states. We carry out a full quantum mechanical scattering calculation for the benchmark system H_2+D, and show that resonances can be moved substantially and that rate coefficients at cold and ultracold temperatures can be increased by several orders of magnitude.