

SEMINARIO
Departamentos de Física Teórica I y II
Universidad Complutense de Madrid

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TITULO: Simulation of interacting spins and anyons with Rydberg lattice gases

LUGAR: FACULTAD DE CIENCIAS FÍSICAS UCM

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ABSTRACT

During the past years the field of ultra cold atomic physics has produced exciting insights into the structure and dynamics of many-body quantum systems. The reason for this success story is rooted in the versatility offered by ultra cold atoms, such as the tunability of their interactions and the advanced techniques that have been developed for their trapping and coherent manipulation.

At present the majority of ultra cold atoms experiments is carried out with ground state atoms. Since very recently, however, there is a growing initiative aiming towards exploiting the unique properties of atoms in highly excited states. Those so-called Rydberg atoms are blessed with remarkable features such as strong and long-ranged interactions together with comparatively long coherence times.

In this talk I discuss static and dynamic many-body phenomena that can be explored with Rydberg atoms in low dimensional lattices. Specifically, I will analyze dynamic and static properties of spin models that can be implemented with a dense Rydberg lattice gas. Moreover, I will show that a one-dimensional Rydberg lattice naturally hosts interacting Fibonacci anyons and therefore constitutes a platform for the study of exotic forms of quantum matter.