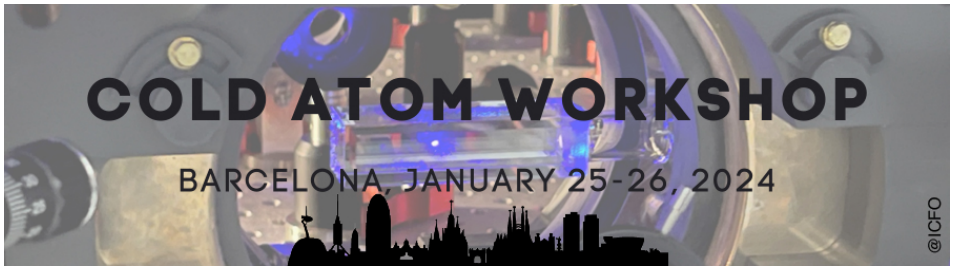

Contribution ID: **8** Type: **not specified**

Exploring quantum magnetism and spin squeezing with Rydberg atom arrays

Thursday 25 January 2024 11:50 (20 minutes)

Rydberg atoms in arrays of optical tweezers offer new perspectives for applications in quantum simulation, quantum computation, and quantum metrology. In this talk, I will describe our recent efforts to control dipolar interactions between Rydberg states to engineer a 2D XY spin Hamiltonian. In this model, we adiabatically prepare low-temperature states of both the XY ferro- and antiferromagnet. In the ferromagnetic case, we observe the presence of long-range order enabled by long-range interactions [1]. I will further show that by performing quantum quenches we can probe the dispersion relation of the excitations in the system [2]. Finally, I will illustrate that, by carefully steering the out-of-equilibrium dynamics, we can generate sizable spin squeezing, which could be used for metrological applications [3].

References:
[1] Chen et al., Nature 616, 691 (2023).
[2] Chen et al., arXiv:2311.11726.
[3] Bornet et al., Nature 621, 728 (2023).”

Presenter: BARREDO (CINN - CSIC ASTURIAS), Daniel

Session Classification: Day 1