Imaging Topological States in Ultracold Atomic Gases

Nathan Goldman*[1]

[1]Université Libre de Bruxelles (ULB) – Belgique

Résumé

The recent experimental realization of synthetic magnetic fields and spin-orbit couplings for ultracold (neutral) atoms opens the attractive possibility to engineer a wide family of topological quantum phases. In such arrangements, one indeed expects to create quantum Hall liquids and topological insulating phases, in a highly controllable and clean environment. However, measuring unambiguous signatures of these quantum phases, such as non-trivial topological order or the presence of current-carrying edge states, remains a fundamental issue for the cold-atom community.

In this talk, I will briefly review the topological phases that could be realized in cold atomic gases. I will discuss the possibility to measure topological properties in these systems through available observables. In particular, I will present efficient methods allowing for the detection of topological edge states in optical lattices.

*Intervenant