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# Quantum simulation of strongly-correlated vortex phases with atoms in optical lattices

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We show that a viable route to generate strongly-interacting chiral phases can exploit the interplay between onsite interactions and flux frustration for bosons in dimerized lattices with  $\pi$ -flux. By constructing an effective theory, we demonstrate how this setting favours the spontaneous breaking of time-reversal symmetry. This can lead to the realization of the long-sought chiral Mott insulator phases, a phase characterized by a vortex array, which we study via DMRG and variational calculations. Furthermore, dynamical properties like the chiral motion of impurities is identified via spectroscopy and quenches. Protocols to perform state preparation and current measurements will also be discussed.

## Sessione

Simulazione

**Primary author:** DI LIBERTO, Marco Fedele (Istituto Nazionale di Fisica Nucleare)

**Presenter:** DI LIBERTO, Marco Fedele (Istituto Nazionale di Fisica Nucleare)

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