

Amorphous quantum magnets in a two-dimensional Rydberg atom array

jeudi 8 février 2024 17:15 (45 minutes)

Amorphous solids, characterized by a well-defined short-range order but do not present long range order, constitute an important research topic in condensed matter. While their properties are known to differ from their crystalline counterpart, a microscopic description is still missing.

In this talk, we propose to explore amorphous quantum magnets with a Rydberg quantum simulator. To this end, we outline an algorithm to generate amorphous quantum magnets and study their ground state and dynamical properties with the help of a linear spin-wave approach. In particular, we calculate the mean-field phase diagrams, probe the energy spectra and calculate dynamical structure factors for given realisations of amorphous solids.

This work opens the road towards the study of amorphous quantum magnets in regimes difficult to simulate classically.

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