

An introduction to many-body localization in condensed matter physics

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The first aim of this seminar is to give a simple and general introduction to the so-called Many-Body Localization (MBL) phenomenon which occurs in a large class of disordered and interacting quantum systems. Then, I will focus on recent results obtained for specific random spin models: the multifractal properties across the MBL transition [1], and a newly discovered chain breaking process [2] which characterises the localized regime, and is at the origin of Kosterlitz-Thouless mechanism for the MBL transition.

[1] N. Macé, F. Alet, N. Laflorencie, Multifractal scalings across the many-body localization transition, *Phys. Rev. Lett.* **123**, 180601 (2019).

[2] N. Laflorencie, G. Lemarié, N. Macé, Chain breaking and Kosterlitz-Thouless scaling at the many-body localization transition in the random-field Heisenberg spin chain, *Phys. Rev. Research* **2**, 042033(R) (2020).