Abstract

Plenary

Wojciech De Roeck (KU Leuven)

An update on Many-Body Localization

I will discuss advances on many-body localization (MBL) from two points of view.

For the sake of this talk, MBL is defined as a robust absence of transport in many-body systems at thermodynamic parameters corresponding tot non-zero entropy density, ie. for example, excluding systems near the ground state.

The first point of view is numerical, and will serve to delineate the extent to which we should expect MBL to occur. Our numerics points to the conclusion that MBL is a rather marginal phenomenon: it is restricted to strongly disordered one-dimensional systems with finite on-site space. This finding is still a topic of ongoing debate.

The second point o view is mathematical and less ambititious: we give up on strict absence of transport and we investigate occurence of slow transport and thermalization. Here slow means 'non-perturbative in some parameter', i.e. due to instanton effects. This phenomenon, that is sometimes also called 'asymptotic localization' or 'quasi-localization' or simply also 'MBL' occurs in much greater generality and it is easily amenable to mathematical analysis.