The Abdus Salam International Centre for Theoretical Physics

**Conference on Many-Body-Localization:
Advances in the Theory and Experimental Progress
Trieste, 10 - 14 July 2017**

DE LUCA, Andrea
Rudolf Peierls Centre for Theoretical Physics
1 Keble Road
Oxford OX1 3NP, U.K.

The Importance of Being Ergodic: Localization and Thermalization in an Open Quantum System

Recently, many-body localization (MBL) has emerged as a possible way to avoid quantum thermalization, when disorder is sufficiently strong to compete with interaction.Â In this situation, ergodicity is not ensured and standard thermodynamics does not apply. We show manifestations of the weak/strong disorder regime in an open and driven quantum system. In particular, we develop the theory of a minimal model for Dynamic Nuclear Polarization (DNP), the most effective technique in NMR to increase nuclear polarization We show two distinct dynamical phases separated by the MBL transition, which is identified by the maximal value of the nuclear polarization. Finally, we apply a similar procedure to the Anderson 3D tight-binding model and again we confirm that the maximal efficiency is a fingerprint of the known localization transition for this model.
