SFB/TRR 21 - Seminar

17. Juli 2015, Stuttgart

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(University of Nottingham)

Out-of-equilibrium dynamics and transitions in Rydberg gases

In the presence of strong dissipation the dynamic of Rydberg gases is governed by so-called kinetic constraints. This means that the relaxation rate of a given atom is dictated by the precise state of its neighbourhood. I will show that these constraints lead to a remarkable rich out-of-equilibrium dynamics although the final stationary state might be perfectly uncorrelated. For example Rydberg gases driven on resonance show surprising self-similar relaxation while off-resonant driving results in the formation and growth of clusters. I will furthermore show that a similar methodology as in the Rydberg gas permits the understanding of the so-called Dynamical Nuclear Polarisation process which is of great current importance in nuclear magnetic resonance for achieving strong signals at relatively low magnetic field strengths.

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