Measurement induced transitions

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The interplay of coherent and incoherent dynamics has a rich and long history in the context of quantum physics. At the basic quantum mechanical level, it is responsible for a plethora of few body effects, of par- ticular relevance to quantum optical systems. Over the last two decades, boosted by impressive progress in both solid state and atomic experiments, this in- terplay has found vast application in the context of many-body phenomena as well. A particularly successful framework in this respect has been the identification of new phases of matter associated with the non-equilibrium steady states of local Liouville dynamics.

In parallel to these developments, a series of recent works has introduced a new perspective that, instead of focusing on the properties of the average steady state, studies the many-body properties at the level of single quantum trajectories. In this context, it has been shown how the competition between quantum measurements and coherent dynamics (either analog or digitally generated) can give rise to transitions that manifest themselves in specific observables that are not properties of the averaged state - such as von Neumann entropies, negativities, or two-time correlation functions.

In the talk I will review our recent contributions to this topics based on Refs. [1, 2, 3, 4, 5, 6, 7]

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