

Long-range correlations and ensemble inequivalence in models of driven systems

David Mukamel, The Weizmann Institute of Science

Long range correlations are a common feature of driven systems with conserving dynamics. A prototypical model in this context is the ABC model, a driven one dimensional three species model evolving under local dynamics. A generalization of this model is presented whereby it evolves under one of two alternative dynamics: (I) density conserving, and (II) density non-conserving dynamics. It is shown that in the case of equal average densities of the three species, both dynamical models exhibit detailed balance with respect to a Hamiltonian with long-range interactions. The model is found to exhibit two distinct phase diagrams, corresponding to the canonical (density conserving) and grand-canonical (non-conserving) ensembles, as expected in systems with long-range interactions. The implication of this result to non-equilibrium steady states, such as those of ABC model with non-equal average densities is discussed.