Collectivities in many-body ensembles with random interactions.

We present a systematic investigation of the nuclear shape, pairing, and decay collectivities that emerge in systems with random interactions.
The development of the mean field and its geometry, multipole collectivities and their dependence on the underlying interactions are explored. The emergence of Elliot's SU(3) algebraic structure appear to be an important precursor of the development of the mean-field's geometric shape and its rotations. We discuss the pairing structure of the wave functions and thermodynamically address the nature of the pairing phase transition in a small system. The irreversible decays and coupling to the virtual continuum lead to significant changes in the internal structure. These include redistribution of resonance widths, collectivizations, and changes in the density of states.
Studies of the nuclear many-body systems presented indicate an important role played by the many-body forces. We explore some of the effects of three-body and higher rank interactions. These types of interactions clearly influence the collective dynamics.