

Emergent SU(3) Symmetry in Random Spin-1 Chains

Eduardo Miranda (Universidade Estadual de Campinas, Brazil)

An important task in random quantum systems is a complete characterization of all possible universality classes. Since this task is far from completed, the identification of new phases is an important step. We have done so while mapping out the complete phase diagram of the most general random SU(2)-invariant spin-1 chains. Noteworthy among the phases found are two of them whose behavior at low energies is characterized by infinite effective disorder. While one is adiabatically connected to the random antiferromagnetic Heisenberg chain, which is fairly well understood, a qualitatively different one emerges at sufficiently large biquadratic couplings. It is characterized, among other things, by a scaling between energy and length scales of excitations which is a stretched exponential with the exponent $1/3$, instead of the usual $1/2$ found in the Heisenberg case. More surprising, however, is the presence of an emergent SU(3) symmetry in both phases, a feature previously unnoticed. We speculate that such emergent symmetries are likely to be found in other random systems of higher spins.