Contributed Talk

# Structure of Wavefunctions of Interacting Many-particle Quantum Systems with One-plus k-body Random Interactions

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Wavefunction structure is analysed for interacting many-fermion/boson systems using Hamiltonian $H$, which is a sum of one-body $h(1)$ and an embedded GOE of $k$-body interaction $V(k)$ with strength $\lambda$. A complete analytical description of the variance of the strength function as a function of $\lambda$ and $k$ is derived and the marker $\lambda t$ defining thermalization region is obtained. In the strong coupling limit ($\lambda > \lambda t$), the conditional q-normal density describes Gaussian to semi-circle transition in strength functions as body rank k of the interaction increases. Further, this interpolating form of the strength function is utilized to describe the fidelity decay after $k$-body interaction quench and also to obtain the smooth form for the number of principal components, a measure of chaos in finite interacting many-particle systems. The smooth form very well describes embedded ensemble results for all $k$ values.