Max-Ent Projected and Restricted Dynamics for Many-Body Quantum Systems

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To address challenges in dealing with approximate effective dynamics and non-Gaussian correlations, it is crucial to acknowledge that both exact dynamics and Mean Field Theoretic (MFT) approaches are confined to Max-Ent manifolds $\mathcal{M}_{\text{Max-Ent}}$ of states σ [1, 2]. Within these manifolds, the system's state, guided by an orthogonally-projected Schrödinger equation of motion, maximizes the von Neumann entropy while sharing expectation values of a set of independent observables, giving rise to a self-consistency condition.

This seminar introduces a variation of the formalism that relaxes the self-consistency condition and employs a simpler form of orthogonal projection, reducing the numerical complexity associated with solving these equations of motion [3]. Consequently, a system of non-linear differential equations governing the dynamics of the logarithm of the density operator emerges, independent of the chosen observables. Our approach, accomplished through a systematic expansion of the basis of operators, facilitates non-perturbative approximations to exact dynamics.

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