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Dynamics and Thermodynamics of a Chiral Symmetry Split Fermionic System XINDONG WANG, Sophyics Technology, LLC, XIAOGUANG ZHANG, Department of Physics, University of Florida, Gainesville, FL — Recent work by Wang et al. proposes a self-consistent effective Hamiltonian that breaks the time reversal/chiral symmetry of the full Hamiltonian of a many-body fermionic system. By adding back the chiral conjugate of the effective Hamiltonian, the chiral symmetry can be restored. In this work, we study the dynamics and thermodynamics of an exactly solved chiral symmetry split system prescribed by a pair of chiral conjugate non-interacting effective Hamiltonian. Results on the dynamical evolution of a pure state are analyzed in the Hilbert space spanned by one of the chiral symmetry split basis states. Quantum decoherence is shown to be the results of the overlap of the two chiral symmetry broken vacuum by properly taking the thermodynamic limit in terms of single fermion degree of freedoms N.

Xindong Wang
Sophyics Technology, LLC

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