

On the Exact Solution to Many-Body Fermionic Systems

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We show that the exact ground state of a many-body fermionic system can be solved using a recursive Bogolyubov transformations procedure and the recursion ends at a manifold of chiral symmetry breaking effective Hamiltonians that are quadratic with inter-orbital pairing and have the exact same energy spectra. Furthermore, the energy spectrum for each of these chiral symmetry breaking effective Hamiltonians represents the single fermion excitation spectrum and each of the eigenstates of the quadratic effective Hamiltonian is a degenerate singular value state of the original Hamiltonian.

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