Fermi liquid nature in one-dimensional strongly attractive Hubbard model

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Since the discovery of the Yang-Baxter equation it has been over 50 years of developments of the exactly solvable models. The study of exactly solved models yields significant applications in cold atoms, condensed matter physics, nuclear physics and mathematics.

In this talk, I will demonstrate that the 1D strongly attractive Hubbard model describing interacting fermionic atoms on a 1D optical lattice presents an elegant Fermi liquid nature at low temperatures. I will show such a free particle nature through quantum scaling, dimensionless ratios, additivity rules of susceptibility, compressibility and specific heat. It turns out that the macroscopic properties/quantities of the Fermi liquids are universal for both 2D/3D and 1D systems. Thus exact Bethe ansatz results provide a unique testing ground for concepts and universal properties of many-body phenomena.