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Finite-entanglement scaling and dynamical correlations of quasi-Fermi liquids

Using tangent-space methods and an extension of finite-entanglement scaling for dynamical correlations, we show the existence of a new class of one-dimensional quantum liquids: the quasi-Femi liquid. This state exhibits characteristics similar to either a Luttinger liquid or a Fermi liquid, depending on the energy scale at which it is examined. We analyze the ground state and dynamical properties by computing the momentum distribution, spectral function and dynamical structure factor. The momentum distribution is discontinuous at the Fermi energy, which contrasts with the spectral function displaying both edge singularities and quasi-particles peaks. The dynamic structure factor resembles that of fermions with irrelevant interactions, with an additional excitonic peak located below the upper branch of the particle-hole continuum. Our results indicate that the quasi-Fermi liquid paradigm goes beyond the Luttinger and Fermi liquids models.

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