

Current response, structure factor and hydrodynamic quantities of a two- and three-dimensional Fermi gas from the operator-product expansion

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We apply the operator-product expansion to determine the asymptotic form of the current response of a Fermi gas in two and three dimensions. The leading-order term away from the one-particle peak is proportional to a quantity known as the contact, the coefficient of which is determined exactly. We also calculate the dynamic structure factor and the high-frequency tails of the spectral viscosities as a function of the scattering length. Our results are used to derive certain sum rules for the viscosities.

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