Dynamic structure function of a cold Fermi gas at unitarity

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We present a theoretical study of the dynamic structure function of a resonantly interacting two-component Fermi gas at zero temperature. Our approach is based on dynamic many-body theory able to describe excitations in strongly correlated Fermi systems. The fixed-node diffusion Monte Carlo method is used to produce the ground-state correlation functions which are used as an input for the excitation theory. Our approach reproduces recent Bragg scattering data in both the density and the spin channel. In the BCS regime, the response is close to that of the ideal Fermi gas. On the BEC side, the Bose peak associated with the formation of dimers dominates the density channel of the dynamic response. Our results agree, in the spin-channel, quite well with recent measurements[1].

1. S. Hoinka, M. Lingham, M. Delehaye, and C. J. Vale:
Dynamic spin response of a strongly interacting Fermi gas, arXiv:1203.4657v1

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