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Ab initio pairing gap, spectral and response functions of two-dimensional ultracold fermionic gases[1] ETTORE VITALI, HAO SHI, MINGPU QIN, SHIWEI ZHANG, William Mary Coll — We study dynamical correlations of two-dimensional (2D) Fermi atomic gases at zero temperature: pairing gap, spectral function, as well as density and spin dynamical structure factors. Building on recent exact numerical calculations of static ground-state properties of the 2D Fermi gas [2] and methodological developments for the computation of dynamical correlation functions [3], we carry out exact numerical calculations using the auxiliary-field quantum Monte Carlo (AFQMC) method which, for the attractive Fermi gas, is free of the fermion sign problem. The correlation functions are analyzed via state-of-art analytic continuation methodologies in order to infer real time dynamical properties. Dynamical correlation functions provide probes of the excitations and allow potentially direct comparisons with spectroscopy and scattering experiments.

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[2]H. Shi, S. Chiesa, and S. Zhang, *Phys. Rev. A* **92**, 033603 (2015)
[3]E. Vitali, H. Shi, M. Qin, and S. Zhang, *Phys. Rev. B* **94**, 085140 (2016)

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