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QMC calculations of the dynamical local field factor of the 2D electron gas NATALIA MATVEEVA, MARKUS HOLZMANN, LPMMC, UMR 5493 of CNRS, Universite Grenoble Alpes, F-38100 Grenoble, France, DAVID CEPERLEY, Department of Physics, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801, USA — We develop a new quantum Monte Carlo method to calculate imaginary time correlation functions for fermions in continuous space in order to access spectral functions. Linear response in imaginary time is obtained based on the variational expression of the thermal density matrix. The exact dynamics is recovered in the non-interacting limit. We apply our new method to the electron gas in two dimensions in the high and low density region and calculate the density fluctuations including many-body correlations in the density matrix. The dynamic structure factor can be accessed by analytic continuation. Our results provides accurate estimation of the dynamical local field factor which quantifies corrections to the RPA approximation.

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