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Nonequilibrium electron dynamics in dense plasmas including dynamical screening and strong coupling CHRISTOPHER MAKAIT, NICLAS SCHLÜNZEN, JAN-PHILIP JOOST, MICHAEL BONITZ, Institut für Theoretische Physik und Astrophysik — The Nonequilibrium Green Functions (NEGF) method is a powerful tool to compute time-dependent expectation values of single-particle observables in correlated quantum many-body systems. Its unfavorable N_t^3-scaling with propagation time N_t could be reduced to N_t^2 by introduction of the Generalized Kadanoff–Baym Ansatz (GKBA)[1]. Recently, an exact time-local (N_t^1) reformulation of the GKBA, the G1–G2 scheme [2,3], has been found for various self energies, which makes this method viable for long time simulations.
In a general basis the G1–G2 scheme has a computationally expensive scaling with basis size (N_b^5-N_b^6). For the uniform electron gas (UEG) however, we found an advantageous $N_b^3 N_t^1$ scaling for both second-order and GW selfenergies, which makes this scheme particularly interesting for this system. Here, we present first relaxation results in 1 and 2 dimensions.
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[2] N. Schlünzen, Jan-Philip Joost, Michael Bonitz, *Phys. Rev. Lett.* 124, 076601 (2020)
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