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Preconditioning the Quantum Many-Body Problem TIMOUR TEN, University of Illinois, JOAQUIN DRUT, The Ohio State University, TIMO LAHDE, Aalto University — Modern algorithmic developments in Lattice Monte Carlo calculations, collectively referred to as Hybrid Monte Carlo (HMC), have dramatically improved the computational scaling of many-fermion simulations for large system volumes V . From the conventional V^3 or V^2 laws, we now know it is possible to reach V^α scaling with $\alpha \simeq 1.25$. However, the overall factor of the scaling law could and should be improved. This factor is determined in part by the number of iterations required for the solution of an ill-conditioned linear problem, which is repeatedly performed in HMC. In this contribution we present the results of a number of preconditioning strategies that accelerate and stabilize this linear problem for the case of strongly interacting non-relativistic fermions in $3 + 1$ dimensions.

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