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**Symmetric minimally entangled typical thermal states, grand-canonical ensembles, and the influence of the collapse bases** MORITZ BINDER, THOMAS BARTHEL, Duke University — Based on DMRG, strongly correlated quantum many-body systems at finite temperatures can be simulated by sampling over a certain class of pure matrix product states (MPS) called minimally entangled typical thermal states (METTS). Here, we show how symmetries of the system can be exploited to considerably reduce computation costs in the METTS algorithm. While this is straightforward for the canonical ensemble, we introduce a modification of the algorithm to efficiently simulate the grand-canonical ensemble under utilization of symmetries. In addition, we construct novel symmetry-conserving collapse bases for the transitions in the Markov chain of METTS that improve the speed of convergence of the algorithm by reducing autocorrelations.

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