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DMRG simulations of SU(N) Heisenberg models using a million of states[1] ANDREAS WEICHSELBAUM, Ludwig Maximilians University, Munich, Germany, SYLVAIN CAPPONI, CNRS Toulouse, Université Paul Sabatier, France, ANDREAS LÄUCHLI, University of Innsbruck, Austria, ALEXEI TSVELIK, Brookhaven National Laboratory, Upton, NY, PHILIPPE LECHEMINANT, Université de Cergy-Pontoise, France — The density matrix renormalization group (DMRG) is applied to SU(N) symmetric Heisenberg chains and ladders while fully exploiting the underlying SU(N) symmetry. Since these models can be motivated from symmetric N-band fermionic models, it is immediately clear that the numerical complexity of simulating SU(N) symmetric models grows exponentially in N. Nevertheless in the presence of symmetry this exponential growth is largely transferred to the symmetry multiplets in that the largest multiplets that appear in the simulation typically grow in size like 10^{N-1}. Therefore while keeping a moderate number of multiplets, the full state space dimension required for converged results can quickly reach a million of states. Recent results on Heisenberg ladders with $N \leq 4$ and varying rung coupling are discussed and contrasted to existing literature.

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