Abstract Submitted
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Time evolution of two holes in $t-J$ chains with anisotropic couplings[1] SALVATORE R. MANMANA, HOLGER THYEN, THOMAS KÖHLER, Institute for Theoretical Physics, University of Goettingen, Germany, STEPHAN C. KRAMER, Fraunhofer ITWM Kaiserslautern, Germany — Using time-dependent Matrix Product State (MPS) methods we study the real-time evolution of hole-excitations in t-J chains close to filling $n = 1$. The dynamics in 'standard' $t-J$ chains with SU(2) invariant spin couplings is compared to the one when introducing anisotropic, XXZ-type spin interactions as realizable, e.g., by ultracold polar molecules on optical lattices. The simulations are performed with MPS implementations based on the usual singular value decompositions (SVD) as well as ones using the adaptive cross approximation (ACA) instead. The ACA can be seen as an iterative approach to SVD which is often used, e.g., in the context of finite-element-methods, leading to a substantial speedup. A comparison of the performance of both algorithms in the MPS context is discussed.

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