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Hamiltonian simulation of lattice gauge theories

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We consider the matrix product state formalism for the simulation of Hamiltonian lattice gauge theories. To this end, we define matrix product states which are manifestly gauge invariant. As an application, we study 1+1 dimensional one flavor quantum electrodynamics, also known as the massive Schwinger model. First, we discuss our results on full quantum non-equilibrium dynamics induced by a quench in the form of a uniform background electric field (i.e. the Schwinger pair creation mechanism) . Furthermore we study the effects of charge screening and confinement in the vacuum for integer and non-integer external charges. Finally, we present some results on finite temperature simulations.
References:
[1] arXiv:1312.6654 [hep-lat]
[2] arXiv:1411.0020 [hep-lat]

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