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## Matrix Product States for the Schwinger model

Matrix Product States (MPS) are considered for the simulation of the Schwinger model (QED in 1+1 dimensions). We construct the most gauge invariant MPS and discuss the consequences for the implementation of optimization algorithms such as the time-dependent variational principle, the DRMG and the iTEBD. Next we turn our attentions to some applications. We compute the single-particle spectrum, investigate confinement induced by a static quark-antiquark pair and consider the Schwinger model at finite temperature. Finally, we also discuss our results on real-time dynamics by bringing the system out of equilibrium by a quench in the form of an electric field. At the end an outlook is presented of the generalization of this setup to higher dimensions.

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