

# TNS for lattice gauge theories: numerical strategies beyond 1D

*Monday, 28 June 2021 11:00 (30 minutes)*

In the last years, the suitability of tensor network states for the study of one-dimensional gauge theories has been established: it is possible to conduct numerical studies of lattice gauge theories (LGT) using TNS that enable precise continuum extrapolations in very different setups, including finite density scenarios, where traditional Monte Carlo approaches fail. A similar systematic study in two dimensions becomes much more challenging, due to increased computational costs, but also to the presence of plaquette terms. With a newly developed update strategy it is nevertheless possible to treat these terms efficiently, as we have demonstrated with the first ab initio iPEPS study of a LGT ( $Z_3$ ) in 2+1 dimensions.

Additionally, other recently introduced numerical TNS techniques that target properties of the models at finite energy density or temperature can be applied to LGT problems, and provide new handles to their physical properties.

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**Session Classification:** Monday Morning