

# Tensor renormalization group and the volume independence in 2D $U(N)$ and $SU(N)$ gauge theories

*Thursday, 9 December 2021 15:00 (20 minutes)*

The tensor renormalization group method is a promising approach to lattice field theories, which is free from the sign problem unlike standard Monte Carlo methods. In this work, we apply the method to two dimensional  $U(N)$  and  $SU(N)$  gauge theories, where we propose a practical strategy to restrict the number of representations in the character expansion when constructing the fundamental tensor. Using this, we investigate the behaviour of singular values in the large- $N$  limit and propose a novel interpretation of the Eguchi-Kawai reduction in the context of TRG. Additionally, with the presence of a theta term, we find a new type of volume independence in the strong-coupling phase, which goes beyond the Eguchi-Kawai reduction.

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