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Numerical simulation of fractional topological charge in SU(N) gauge theory coupled with $\mathbb{Z}_N$ 2-form gauge fields

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In recent years, the low-energy physics of gauge theories has been explored through the concept of generalized symmetries, which extends the notion of the traditional symmetry. In this talk, by using a lattice QCD code set, LatticeQCD.jl, we carry out numerical simulations of lattice $SU(N)$ gauge theory coupled with $\mathbb{Z}_N$ 2-form gauge fields. Such couplings provide a completely local description of the 't Hooft twisted boundary condition. We explicitly demonstrate the fractional topological charge, a key element in observing anomaly of generalized symmetry.

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