

Fractional topological charge in lattice non-Abelian gauge theory

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We extend the definition of Lüscher's lattice topological charge to the case of 4d $SU(N)$ gauge fields coupled with Z_N 2-form gauge fields. This result is achieved while maintaining the locality, the $SU(N)$ gauge invariance, and Z_N 1-form gauge invariance, and we find that the manifest 1-form gauge invariance plays the central role in our construction. This result gives the lattice regularized derivation of the mixed 't Hooft anomaly in pure $SU(N)$ Yang-Mills theory between its Z_N 1-form symmetry and the θ periodicity.

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