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## Lattice construction of mixed 't Hooft anomaly with higher form symmetry

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We extend the definition of Luscher's lattice topological charge to the case of 4d  $SU(N)$  gauge fields coupled with  $\mathbb{Z}_N$  2-form gauge fields. This result is achieved while maintaining the locality, the  $SU(N)$  gauge invariance, and  $\mathbb{Z}_N$  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  $\mathbb{Z}_N$  1-form symmetry and the  $\theta$  periodicity.

### Topical area

Theoretical Developments

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