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Color confinement due to topological defects —restoration of residual gauge symmetries—

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The local gauge symmetry remaining even after imposing a gauge fixing condition is called the residual local gauge symmetry, which is spontaneously broken in the perturbative vacuum, and is expected to be restored in the true confining vacuum. Indeed, the criterion for restoring a special choice of the residual gauge symmetry was shown to be equivalent to the Kugo-Ojima color confinement criterion in the Lorenz gauge. In the previous paper, we demonstrated that such restoration can occur even in the Maximal Abelian gauge due to topological defects. However, it was later found that the topological defects introduced in the previous paper give an infinite Euclidean action and hence do not contribute to the path integral. In this talk, therefore, we reexamine modified topological defects giving a finite Euclidean action to contribute to the path integral. We show the restoration of the residual local gauge symmetry in the Maximal Abelian gauge due to such a class of topological defects.

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