

Confinement of quarks in higher representations in view of dual superconductivity.

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Dual superconductor picture is a promising scenario for quark confinement. For quarks in the fundamental representation, we have presented a new formulation of Yang-Mills theory on the lattice, where decomposed restricted fields play the dominant role in confinement, and demonstrated numerical evidences for the dual superconductivity. To establish this picture, we must show evidences for various situations, e.g., for quarks in higher representations.

In this talk, we investigate the Wilson loops in higher representations. By virtue of the non-Abelian Stokes theorem, we propose the suitable Wilson loop operator made of the restricted field in the fundamental representation, so that it reproduces the correct behavior of the original Wilson loop in the higher representation. We perform lattice simulations to measure the static quark potential using the Wilson loop operator in higher representations. We find that our proposed Wilson loop operators reproduce the correct behavior of the original Wilson loop average and overcome the problem that occurs in the naively Abelian-projected Wilson loop operator for higher representations.

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