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Surface operators study within the lattice QCD

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The most important probes for the phase states of a four-dimensional gauge field theory are the Wilson and t'Hooft line operators that are defined on one-dimensional curves in the space-time. However, for more detail understanding of four-dimensional gauge field theory dynamics and vacuum topology we need additional probes expressed by operators defined on the subspaces with higher dimensions. Possible candidates are operators that are defined on the two-dimensional surface in the four-dimensional space-time. In the present work the surface operator in the lattice QCD is studied. The Witten parameter dependence on the surface area and volume studied in confinement and deconfinement phases.

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