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Cartan-Based Abelian projection for Yang-Mills theory

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Content

Quark confinement is still an open and challenging problem in modern physics, with a formal explanation for its origin being pursued since the acceptance of the quark model. Advances in the area are difficult since confinement lies in the infrared regime of the theory, where perturbation theory is not applicable. Hence, one needs to use non-perturbative methods to study confinement, like lattice QCD. Focusing only on the Yang-Mills theory, Lattice Gauge Theory (LGT), we can study the confinement scenarios via numerical simulations. Among these, 't Hooft's idea that the Abelian components of the Yang-Mills fields dominate the infrared regime is one that has supporting evidences from LGT. In this work, we present our study of this Abelian dominance scenario with a projection scheme based on the Cartan subalgebra, and present results about confinement signatures.

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