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Gauge-fixing with compact lattice gauge fields

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Proper treatment of redundant gauge degrees of freedom seems necessary for gauge theories with terms that explicitly break gauge symmetry (e.g., in chiral gauge theories with manifestly local formulation of lattice fermions) since these degrees of freedom become manifestly present in such theories. There is also a no-go theorem prohibiting use of BRST formalism in theories with compact gauge fields. Results will be presented of our investigation of pure U(1) gauge theory, with higher derivative gauge-fixing term that breaks BRST, at strong gauge coupling that show that the redundant gauge degrees of freedom decouple just as seen previously in the weak coupling region. The general scheme of numerical simulation of an SU(2) gauge theory in the equivariant BRST (eBRST) formalism with dynamical ghost fields in the SU(2)/U(1) coset space will also be presented. Details of the results of the eBRST SU(2) lattice gauge theory and the theory in the reduced limit (obtained by gauge coupling taken to zero) will be covered by Mugdha Sarkar.

Primary author: Prof. DE, Asit Kumar (Professor)

Co-author: Mr SARKAR, Mugdha (Saha Institute of Nuclear Physics)

Presenter: Prof. DE, Asit Kumar (Professor)

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