

Coupling Nonlinear Sigma Matter to Yang-Mills Fields: Symmetry Breaking Patterns

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We extend the traditional formulation of Gauge Field Theory by incorporating the (non-Abelian) gauge group parameters (traditionally simple spectators) as new dynamical (nonlinear-sigma-model-type) fields. These new fields interact with the usual Yang-Mills fields through a generalized minimal coupling prescription. This reformulation of Gauge Field Theory has been successfully applied to (external) space-time symmetry groups [1, 2]. Here we study the case of internal gauge symmetry groups, namely $SU(N)$. We show how to couple standard Yang-Mills Theory to Nonlinear-Sigma Models on cosets of $SU(N)$ [3]. These different couplings lead to distinct (chiral) symmetry breaking patterns and Higgs-less mass-generating mechanisms.

References

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