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Probing the Yang-Mills vacuum with adjoint zero-modes

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We analyse in detail a filtering method proposed by Gonzalez-Arroyo and Kirchner to eliminate ultra-violat noise and probe the topological content of Monte-Carlo ensembles. The proposal is based on looking for the low lying eigen-modes of a super-symmetric operator constructed from a projection of the adjoint-Dirac operator. For classical configurations the density of these modes provides a direct estimate of the self-dual and anti-self-dual part
of the gauge action density. We test the performance of the proposal on a set of prepared configurations including both smooth and heated instantons, and instanton-antiinstanton pairs. For this, the super-symmetric operator is implemented on the lattice through a projection of the Neuberger-Dirac operator. A detailed analysis of finite volume and lattice artifacts is presented. We will also show preliminary results of the application of the method to the analysis of Monte Carlo configurations.

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talk

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