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Fluctuation Determinants in the Presence of Instantons

At high temperatures, where the strong coupling parameter runs to small values, the presence of instantons have a significant effect on the QCD vacuum structure. This in turn affects the structure of the partition function at these temperatures, from which a great amount of information about the system can be extracted. However, the presence of instantons complicates computation of the partition function, by way of introducing discrete zero-modes to the path integral. We explain how to generalize the well known Faddeev-Popov gauge-fixing procedure to incorporate these discrete zero-modes, and subsequently how to obtain an expression for the 1-instanton partition function to quadratic order.

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