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Deconfinement transition in a massive extension of the background field gauge

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We discuss the breaking of center symmetry in pure SU(2) and SU(3) Yang-Mills theories at finite temperature. We explore this question using a perturbative approach within a massive extension of the background field gauge which is seen as a phenomenological way of taking into account the effect of the Gribov copies. At one-loop order, this simple perturbative calculation yields a second order phase transition for SU(2) and a first order one for SU(3), in agreement with lattice results and with previous findings from functional renormalization group techniques. I also discuss the average of the Polyakov loop, computed at the same order, and comment on the effect of higher loop corrections.

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