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## Confinement-deconfinement transition and $Z_3$ symmetry in SU(3)-Higgs theory

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We study the effect of Higgs in the fundamental representation, on  $Z_3$  symmetry in SU(3)-Higgs theory. In the presence of the Higgs, the Euclidean action breaks the  $Z_3$  symmetry explicitly. The determination of the strength of explicit breaking requires integration of the matter fields. We carry out this using lattice Monte Carlo simulations, near the confinement-deconfinement transition. The partition function averages of observables that are sensitive to the  $Z_3$  symmetry, i.e the Polyakov loop, gauge Higgs interaction terms etc. show that the strength of  $Z_3$  explicit breaking decreases steadily with the lattice cut-off, and is possibly vanishingly small in the continuum limit. Simultaneously the strength of the confinement-deconfinement transition grows stronger. These results suggest that similar studies in QCD are necessary to determine the explicit breaking of  $Z_3$  symmetry in the QGP-hadron transition. For small explicit breaking  $Z_3$  meta-stable states are expected near the transition and may be relevant for heavy-ion collisions.

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