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Polyakov line actions from SU(3) lattice gauge theory with dynamical fermions via relative weights

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Summary

We extract an effective Polyakov line action from an underlying SU(3) lattice gauge theory with dynamical fermions via the relative weights method. The center-symmetry breaking terms in the effective theory are fit to a form suggested by the hopping-parameter expansion, and the effective action is solved at finite chemical potential by a mean field approach. We show results for a small sample of lattice couplings, lattice actions, and lattice extensions in the time direction. We find in some instances that the long-range couplings in the effective action are very important to the phase structure, and that these couplings are responsible for long-lived metastable states in the effective theory. Only one of these states corresponds to the underlying lattice gauge theory.

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