

Abstract Submitted
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**The axial anomaly and three-flavor NJL model with confinement:
constructing the QCD phase diagram** PHILIP POWELL, GORDON BAYM,
University of Illinois at Urbana-Champaign, BAYM GROUP TEAM — We investigate the phase structure of massless three-flavor QCD by extending the Nambu–Jona-Lasinio model to include the effects of confinement and the axial anomaly. We study the interplay between the chiral and diquark condensates induced by the axial anomaly, as well as their relationship with the Polyakov loop, which parameterizes confinement. By minimizing the thermodynamic potential we construct the QCD phase diagram and investigate the possibility of realizing a recently discovered low temperature critical point and an associated BEC-BCS crossover. We also perform a Ginzburg-Landau expansion of the thermodynamic potential, comparing our results to a prior analysis based purely on symmetry considerations, in order to assess the lowest-order effects of the condensate-confinement couplings.

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