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# Color-flavor center symmetry in QCD and its order parameter

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Common lore suggests that no well-dened order parameters exist in N-color QCD with massive quarks which are non-trivial at zero baryon density. However we find that, such order parameters do exist when there are n_f quark flavors with a common mass and gcd(nf ;N) > 1. Such theories have Zd color-flavor center symmetry arising from intertwined color-center transformations and cyclic flavor permutations. The realization of this symmetry changes depending on the values of the temperature, baryon chemical potential, and nf/N, with implications for conformal window studies and the QCD phase diagram.

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