



# PHYSICS AND ASTRONOMY SEMINAR

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## “Order parameters and color-flavor center symmetry in QCD”

### Abstract

Common lore suggests that  $N$ -color QCD with massive quarks has no useful order parameters that can be nontrivial at zero baryon density. However, such order parameters do exist when there are  $n_f$  quark flavors with a common mass and  $d \equiv \gcd(n_f, N) > 1$ . These theories have a  $Z_d$  color-flavor center symmetry arising from intertwined color center transformations and cyclic flavor permutations. The symmetry realization depends on the temperature, baryon chemical potential, and value of  $n_f/N$ , with implications for conformal window studies and dense quark matter.

Tuesday, January 16, 2018

10:00 a.m.

**CLE Building**  
**Room D134**