Nuclear Theory

How large is "large N_c" for Nuclear matter?

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We argue that a so far neglected dimensionless scale, the number of neighbors in a closely packed system, is relevant for the convergence of the large N_c expansion at high chemical potential. It is only when the number of colors is large w.r.t. this new scale ($\sim \order{10}$) that a convergent large N_c limit is reached. This provides an explanation as to why the large N_c expansion, qualitatively successful in in vacuum QCD, fails to describe high baryo-chemical potential systems, such as nuclear matter. It also means that phenomenological claims about high density matter based on large N_c extrapolations should be treated with caution.

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