

Chern-Simons-matter theory at large baryon number

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It is now known well that taking the sector of large charge semi-classicalizes the dynamics of theories with a global symmetry. One can exploit this fact and compute physical quantities in the form of the asymptotic expansion in terms of global charge (the large charge expansion).

The method of large charge expansion is not only useful in computing physical quantities at large global charge, but it can also be used to derive consistency conditions on the theory itself. In this talk, I will concentrate on the $SU(N)$ Chern-Simons-matter theories at large baryon number and study the lowest energy configuration at large baryon number and prove that it is spatially uniform on the torus spatial slice. This in turn negates the naïve folklore (which is certainly true on the sphere spatial slice) that such theories goes to the singlet sector of $O(4)$ Wilson-Fisher fixed point at large level, k , on the torus spatial slice.

Disclaimer: Although my ultimate goal is to understand 3D dualities in this framework, I can only make a brief comment about them because my understanding is still limited.