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Nonrelativistic CFTs at large charge

Tuesday 5 July 2022 11:30 (30 minutes)

I will discuss the large-charge expansion of the conformal dimension $\Delta(Q)$ of the lowest operator of charge Q in nonrelativistic CFTs using the state-operator correspondence. The latter requires coupling the theory to an external harmonic trap that confines the particles to a spherical cloud, at the edge of which the effective theory breaks down and leads to divergences. I will show how to build the appropriate counterterms living at the edge of the cloud and discuss the resulting expansion for $\Delta(Q)$, which is significantly richer than its relativistic counterpart. In particular, there is a rich structure of $\log(Q)$ terms emerging from this analysis. On the other side of the correspondence, this also provides new corrections to the Thomas-Fermi approximation of the unitary Fermi gas, and I will comment on their relevance for ultracold atom physics.

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