

APCTP SEMINAR

Non-perturbative Corrections to the Large Charge Expansion

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December 29th (Wed.) 15:00 (KST)

Online via ZOOM

Physical quantities of theories with a global symmetry can be computed in the $1/Q$ (inverse charge) expansion, in a controlled fashion. This is true even when the theory is strongly-coupled, and I will first give you a reasoning for this using effective field theory. As an example, we will use the $O(2)$ Wilson-Fisher theory in 3 dimensions, and compute the operator dimension of ϕ^Q .

Second, I will combine the method with the epsilon expansion, and reproduce the result of the EFT. I also argue that there is an interesting double scaling limit $\epsilon*Q=const$, with epsilon small and Q large, which also reproduces the Feynman diagram computation when the double-scaling parameter is small.

Lastly, I will discuss non-perturbative corrections to the formula. There, I will mostly speak about Wilson-Fisher theory in $D=4+\epsilon$ dimensions, instead of $D=4-\epsilon$, where we will compute the leading imaginary part of the operator dimension. I will also make a very preliminary comment about resurgence in this double-scaling limit.

■ ZOOM Webinar

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