

PARTICLE PHYSICS SEMINAR SERIES

EFT for CFT with large charge

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4:00 pm - Rm 415 NSH

In a generic conformal field theory the spectrum of operators carrying a large $U(1)$ charge can be analyzed semiclassically. The key is the operator state correspondence by which such operators are associated with a finite density superfluid phase for the theory quantized on the cylinder. The dynamics is dominated by the corresponding Goldstone hydrodynamic mode and the derivative expansion coincides with the inverse charge expansion. I will illustrate this situation by first considering simple quantum mechanical analogues and then will systematize the approach by employing the coset construction for non-linearly realized space-time symmetries. Focussing on a 3-dimensional theory I will illustrate that the three point function coefficients turn out to satisfy universal scaling laws and correlations as the charge and spin are varied. Lastly I'll show how the approach can be generalized to the case of large spin by considering vortices in the superfluid.



PHYSICS