Contribution ID: **28** Type: **not specified**

Long Range Model at Large Charge and Large N

Thursday 7 July 2022 15:30 (30 minutes)

We study operators with large charge j in the d-dimensional $O(N)$ model with long range interactions that decrease with the distance as $1/r^{d+s}$, where s is a continuous parameter. We consider the double scaling limit of large N, large j with $j/N = \hat{j}$ fixed, and identify the semiclassical saddle point that captures the two-point function of the large charge operators in this limit. The solution is given in terms of certain ladder conformal integrals that have recently appeared in the literature on fishnet models. We find that the scaling dimensions for general s interpolate between $\Delta_j \sim \frac{(d-s)}{2} j$ at small $\hat{j}$ and $\Delta_j \sim \frac{(d+s)}{2} j$ at large $\hat{j}$, which is a qualitatively different behavior from the one found in the short range version of the $O(N)$ model. We also derive results for the structure constants and 4-point functions with two large charge and one or two finite charge operators. Using a description of the long range models as defects in a higher dimensional local free field theory, we also obtain the scaling dimensions in a complementary way, by mapping the problem to a cylinder in the presence of a chemical potential for the conserved charge. Based on arXiv:2205.00500 with S. Giombi and H. Khanchandani.

Presenter: HELFENBERGER, Elizabeth (Princeton University)