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Symmetry resolution of entanglement measures in excited states of (1+1)dimensional massive integrable quantum field theories

Wednesday, 5 July 2023 12:00 (30 minutes)

In this talk I will present the results obtained with my supervisor Dr. Olalla Castro-Alvaredo and other collaborators on the symmetry resolution of entanglement measures in excited states of (1+1)d massive integrable quantum field theory (IQFT). This work generalises the results known to hold for excited states of massive IQFT with no internal symmetry to the case in which the theory enjoys a $U(1)$ symmetry and the entanglement entropy (EE) admits a charge decomposition. Specifically, we looked at a complex free boson and a complex free fermion on a circle. The results are obtained through a field-theoretic approach that makes use of a “replica trick” and generalised twist fields. Because of the universality features of our formulae, we found that these can be derived also in a much simpler setup, in which the excitations are multi-qubit states. Our theoretical predictions perfectly matches the numerical analysis performed on two different lattice Hamiltonians. Finally, I will briefly present some further generalisations of this work to higher dimensional theories, interacting/non integrable theories and to other entanglement measures.

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Track Classification: Participants Talks