Contribution ID: **19** Type: **Parallel**

Information, dualities, and deconfinement

Computing the entanglement entropy in lattice gauge theories is often accompanied by ambiguities. In this talk I argue that compactifying the theory on a small circle $\mathbb{S}^1$ evades these difficulties. In particular, I study Yang-Mills theory on $\mathbb{R}^3 \times \mathbb{S}^1$ with double-trace deformations or adjoint fermions and hold it at temperatures near the deconfinement transition. This theory is dual to a multi-component (electric-magnetic) Coulomb gas that can be mapped to an XY-spin model with $\mathbb{Z}_p$ symmetry-preserving perturbations. I study Renyi mutual information (RMI) of the XY-spin model by means of the replica trick and Monte Carlo simulations. These are expensive calculations, since one in general needs to suppress lower winding vortices that do not correspond to physical excitations of the system. I use a T-duality that maps the original XY model to its mirror image, making the extraction of RMI a much efficient process. The simulations indicate that RMI follows the area law scaling, with subleading corrections, and this quantity can be used as a genuine probe to detect deconfinement transitions. I also discuss the effect of fundamental matter on RMI and the implications of these findings in gauge theories.

Author: Dr ANBER, Mohamed (Lewis & Clark College)

Presenter: Dr ANBER, Mohamed (Lewis & Clark College)

Session Classification: Theoretical Developments

Track Classification: Theoretical Developments