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Renyi Entropy due to the Presence of Static Quarks

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We study the entanglement entropy in $SU(3)$ pure gauge theory due to the presence of static quarks. Using a replica approach we investigate the $q=2$ Renyi entropy across various partitions of space A and \bar{A} . We use this to find the excess entanglement entropy induced by the presence of a quark pair in confinement, and by the presence of a single quark in deconfinement. At $4/3 T_c$, we find that the entanglement entropy scales to zero, while at $T_c/2$, we find the entropy scales to a finite non-zero value in the continuum. In the latter case, we explore the entanglement entropy induced by the QCD string in both longitudinal and transverse directions. We also show preliminary results suggesting the entanglement entropy scales with the surface area of the region.

Topical area

Vacuum Structure and Confinement

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