



Contribution ID: 144

Type: Oral presentation

The torelon spectrum and the world-sheet axion

Monday, 26 July 2021 14:00 (15 minutes)

We present a major update on the spectrum of the closed flux-tube in $D = 3 + 1$ $SU(N)$ gauge theories. Namely, we calculate the excitation spectrum of a confining flux-tube which winds around a spatial torus as a function of its length l , for short as well as long tubes. We do so for $N = 3, 5, 6$ and two different values of the lattice spacing. Our states are characterised by the quantum numbers of spin J , transverse parity P_{\perp} , longitudinal parity P_{\parallel} as well as by the longitudinal momentum p_{\parallel} . Our extended basis of operators used in combination with the generalized eigenvalue method enables us to extract masses for all irreducible representations characterised by $\{J, P_{\perp}, P_{\parallel}\}$.

We confirm that most of the low-lying states are well described by the spectrum of the Goddard–Goldstone–Rebbi–Thorn string. In addition we provide strong evidence, that in addition to string like states, massive modes exist on the bulk. More precisely the ground state with quantum numbers $J^{P_{\perp}, P_{\parallel}} = 0^{- -}$ exhibits a behaviour which is in agreement with the interpretation of being an axion on the worldsheet of the flux-tube. This state arises from a topological interaction term included in the effective world-sheet action. In addition we observe that the second excited state with $J^{P_{\perp}, P_{\parallel}} = 0^{+ +}$ behaves as a massive mode with mass twice that of the axion.

Primary authors: ATHENODOROU, Andreas (University of Pisa); Prof. TEPER, Michael (University of Oxford)

Presenter: ATHENODOROU, Andreas (University of Pisa)

Session Classification: Vacuum Structure, Confinement, and Chiral Symmetry

Track Classification: Vacuum Structure, Confinement, and Chiral Symmetry