

Confinement in Lattice QCD

Wednesday, 21 December 2022 10:30 (30 minutes)

QCD provides the fundamental description of the strong force and is a key component of the Standard Model. QCD is a quantum gauge field theory with local $SU(3)$ symmetry that describes the interactions of coloured quarks and gluons. These are observed to be confined inside hadronic states, such as the protons, neutrons and pions. Colour confinement is among the most important and fascinating phenomena in fundamental physics. A characteristic feature of confinement is the formation of chromo-electric flux tubes, usually called QCD strings, that connect a quark with an antiquark. These strings have been observed in numerical Lattice QCD calculations and found that they behave to an adequate extent as bosonic Nambu-Goto strings. I would thus, present a general overview of confinement and I will then focus on the behaviour of flux-tubes as bosonic strings by focussing on our new findings on the spectrum of closed flux-tubes. Namely, our calculations demonstrate that most flux tube states exhibit a spectrum which can be approximated adequately by Nambu-Goto and in addition there is strong evidence for the existence of a massive axion on the world-sheet of the QCD flux-tube as well as a bound state of two such axions.

Primary author: ATHENODOROU, Andreas (The Cyprus Institute)

Presenter: ATHENODOROU, Andreas (The Cyprus Institute)

Session Classification: Session 9