

Contribution ID: 145

Type: Talk

Topological Data Analysis of Monopole Currents in U(1) Lattice Gauge Theory

Friday, 2 August 2024 12:15 (20 minutes)

Compact U(1) Lattice Gauge Theory is known to have a confinement phase that can be explained in terms of condensation of magnetic monopoles. In this talk, we shall explain how Topological Data Analysis (TDA) may be used to quantitatively analyse monopoles across the deconfinement phase transition of the model. We construct a cubical complex from monopole current networks and show that homological invariants associated to current networks allow for a precise estimation of the critical inverse coupling. Further, by designing a suitable filtration, we show that persistent homology may be used to quantitatively characterise the nature of current networks in the deconfined phase.

Primary author: CREAN, Xavier (Swansea University)
Co-authors: LUCINI, Biagio (Swansea University); GIANSIRACUSA, Jeffrey (Durham University)
Presenter: CREAN, Xavier (Swansea University)
Session Classification: Vacuum structure and confinement

Track Classification: Vacuum Structure and Confinement