Contribution ID: **95**   Type: **Poster**

Lattice Chern-Simons term for (2+1)-dimensional QED

Chern-Simons gauge theories have a deep and broad impact on a wide range of physics research, ranging from parity anomalies in quantum field theory to the theory of the integer and fractional quantum Hall effects, and the effective field theory description of chiral spin liquids in condensed matter physics. Despite the fact that Chern-Simons theories are well understood as a continuum field theory, there is still limited knowledge on how to find a compact Hamiltonian lattice formulation in 2+1 dimensions. This task turns out to be highly nontrivial, and we take a first step towards a lattice formulation by considering quantum electrodynamics on the lattice in the presence of a Chern-Simons term. We propose a compact lattice formulation for the Chern-Simons term in terms of the usual operators acting on the links, which we benchmark numerically against theoretical predictions. Our formulation is completely general and also suited for other Hamiltonian approaches such as quantum computing.

Primary authors: Dr FUNCKE, Lena (University of Bonn); Dr KUEHN, Stefan (DESY Germany); HASSAN, Syed Muhammad Ali (The Cyprus Institute)

Presenter: HASSAN, Syed Muhammad Ali (The Cyprus Institute)

Session Classification: Poster session