The 38th International Symposium on Lattice Field Theory

LATTICE 21

JULY 26-30 2021, ZOOM/GATHER@MIT

Contribution ID: **309** Type: **Oral presentation**

The sign problem, {\mathcal PT} symmetry, and exotic phases

Tuesday, 27 July 2021 21:30 (15 minutes)

The phase diagram of finite-density QCD is potentially quite complex. Like other lattice models with sign problems and generalized $\mathcal{PT}$ symmetry, equilibrium states of lattice QCD at finite density may be inhomogeneous, with commensurate and incommensurate patterned phases. The phase structures of such models are determined by a set of interwoven concepts: $\mathcal{PT}$ symmetry, Lee-Yang zeros, violation of spectral positivity, Lifshitz instabilities, NP-hard complexity, and lattice duality. $\mathcal{PT}$ symmetry combined with lattice duality leads to models with removable sign problems in broad universality classes with rich phase structures. These models can be simulated on the lattice by standard techniques and analytical methods may be applied as well. These ideas are illustrated using models from the $i\phi^3$, $Z(2)$, $Z(3)$ and $SU(N)$ universality classes.

Primary authors: OGILVIE, Michael (Washington University in St. Louis); SCHINDLER, Moses (Washington University in St. Louis); SCHINDLER, Stella (Massachusetts Institute of Technology)

Presenter: OGILVIE, Michael (Washington University in St. Louis)

Session Classification: QCD at nonzero Temperature and Density

Track Classification: QCD at nonzero Temperature and Density