Contribution ID: **408** Type: **Oral Presentation**

Loop-string-hadron formulation of an SU(3) gauge theory with dynamical quarks

Monday, August 8, 2022 3:40 PM (20 minutes)

The Hamiltonian formalism for lattice gauge theories has experienced a resurgence of interest in recent years due to its relevance for quantum simulation, a major goal of which is the solution of sign problems in QCD. The particular formulation of the Hamiltonian formalism is itself an important design decision, where factors to consider include (non)locality of the degrees of freedom, (non)Abelian constraints, and computational costs associated with simulating the Hamiltonian.
This work represents a key step toward understanding the costs and benefits associated with the loop-string-hadron (LSH) formulation of lattice gauge theories by generalizing the original SU(2) construction to SU(3) (in 1+1 dimensions). We show that the SU(3) LSH construction is indeed a straightforward generalization of its SU(2) counterpart with all salient theoretical features left intact—particularly the conversion of SU(3) Clebsch-Gordan coefficients into explicit functions of LSH number operators. The validity of the LSH approach is underscored by demonstrating numerical agreement with the better-known purely-fermionic formulation of the theory (with open boundary conditions).

Primary authors: Prof. RAYCHOWDHURY, Indrakshi (BITS-Pilani, KK Birla Goa Campus, Goa, India.); KADAM, Saurabh Vasant (University of Maryland, College Park, US); STRYKER, Jesse (University of Maryland, College Park)

Presenter: KADAM, Saurabh Vasant (University of Maryland, College Park, US)

Session Classification: Theoretical Developments

Track Classification: Theoretical Developments and Applications beyond Particle Physics