Contribution ID: **301**   Type: **Oral presentation**

Simulation of Open LFT

Monday 26 July 2021 13:45 (15 minutes)

Open lattice field theories are useful in describing many physical systems. Yet their implementation in traditional quantum computing is hindered by the requirement of Hermiticity. One method used to overcome this is embedding the non-Hermitian system within a larger Hermitian system by introducing ancillary qubits. We implement the transverse Ising Model with an addition of an imaginary longitudinal magnetic field. We show for two-qubit systems this method works very well. For larger systems in the NISQ era, a robust noise model is needed. We investigate the robustness to noise of this methodology for larger quantum systems using a QISKIT-based noise model.

Primary author: HITE, Michael (University of Iowa)

Co-authors: HUBISZ, Jay (Syracuse University); SAMBASIVAM, Bharath (Syracuse University); GUSTAFSON, Erik (University of Iowa); YOCKEY, Judah (Fermilab)

Presenter: HITE, Michael (University of Iowa)

Session Classification: Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

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