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Stochastic and Tensor Network simulations of the Hubbard Model

Saturday, August 13, 2022 9:50 AM (30 minutes)

The Hubbard model is an important tool to understand the electrical properties of various materials. More specifically, on the honeycomb lattice it is used to describe graphene predicting a quantum phase transition from a semimetal to a Mott insulating state. In this talk I am going to explain two different numerical techniques we employed for simulations of the Hubbard model: The Hybrid Monte Carlo algorithm on the one hand allowed us to simulate unprecedentedly large lattices, whereas Tensor Networks can be used to completely avoid the sign problem. Respective strengths and weaknesses of the methods will be discussed.

Primary author: Mr OSTMEYER, Johann (University of Liverpool)

Presenter: Mr OSTMEYER, Johann (University of Liverpool)

Session Classification: Plenaries

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