



Contribution ID: 291

Type: **Oral Presentation**

T- μ phase diagram using classical-quantum hybrid algorithm

Thursday, August 11, 2022 12:30 PM (20 minutes)

We report results on the Schwinger model at finite temperature and density using a variational algorithm for near-term quantum devices. We adapt β -VQE, a classical-quantum hybrid algorithm with a neural network, to evaluate thermal and quantum expectation values and study the phase diagram for the massless Schwinger model along with the temperature and density. By comparing the exact variational free energy, we find that the variational algorithm works for the Schwinger model for $T>0$ and $\mu>0$. As a result, we obtain a qualitative picture of the phase diagram for the massless Schwinger model. This talk is based on arXiv:2205.08860.

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Session Classification: Algorithms

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