



Contribution ID: 9

Type: talk

BBGKY hierarchy for zero noise extrapolation in quantum error mitigation

Tuesday 21 January 2025 11:30 (45 minutes)

The phase diagram of QCD at finite densities remains numerically inaccessible by classical computations. Quantum computers, with their potential for exponential speedup, could overcome this challenge. However, their current physical implementations are affected by quantum noise. In this contribution, I will introduce a novel quantum error mitigation technique based on a BBGKY-like hierarchy, which is applicable to any arbitrary digital quantum simulation. The core idea is to improve zero-noise extrapolations by incorporating additional constraints from the hierarchy equations associated to the digital spin system. Our preliminary results indicate that the mitigation scheme systematically improves the quality of the (1+1)-Schwinger model measurements.

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Session Classification: Tuesday morning