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Advanced tensor network algorithms for quantum many-body problems and quantum computation

Friday, 29 August 2025 09:30 (1 hour)

Tensor networks offer a powerful and versatile framework for addressing the complexity of quantum many-body systems and the challenges in quantum computing. This talk presents recent advances in applying tensor network algorithms within quantum-classical hybrid computing frameworks, particularly their integration with high-performance computing (HPC) environments. We explore how tensor networks serve as efficient representations for quantum states, enabling breakthroughs in quantum embedding schemes, error correction protocols, and circuit simulation techniques. We further highlight the emerging role of tensor-network-based Monte Carlo methods, which combine the strengths of stochastic sampling and structured representations to enhance simulation accuracy and scalability.

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