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Prospects for ab-initio Calculations of Nuclei with Quantum Computing

Friday, June 1, 2018 5:50 PM (20 minutes)

In this talk, we report on the first nuclear physics computations performed on quantum computers. Addressing superconducting qubits provided by IBM and Rigetti via cloud servers, we calculate the binding energy of the deuteron to within a few percents. This is achieved by implementing the hybrid classical-quantum variational eigensolver algorithm with a low-depth version of the unitary coupled-cluster ansatz. I will discuss our results, experience, and future directions within the context of the near term noisy quantum computing paradigm.

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