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Quantum simulation for nuclear physics

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A vigorous program has formed in recent years in various physics disciplines to take advantage of near-term and future quantum-simulation and quantum-computing hardware to study complex quantum many-body systems, building upon the vision of Richard Feynman. Such activities have also started in nuclear physics, hoping to bring new and powerful experimental and computational tools to address a range of challenging problems in strongly interacting nuclear many-body systems. In this talk, I review a number of important developments, including proposals for simulating strongly interacting quantum field theories, and for quantum computations of hadron and nuclear structure. The hardware technologies that are expected to enable both the analog simulations and the digital quantum computations of these problems will be enumerated, and the case for hardware co-design in the upcoming years will be motivated.

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