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Quantum simulations with ultracold atoms[1]

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Precise understanding of strongly interacting systems, from electrons in materials and frustrated magnets to nuclear matter, is a major challenge for modern physics. Often, theoretical description of key models is severely plagued by the intricate quantum mechanics at play. This prompted a challenging effort of using ultra-cold atoms to realize Feynman's emulators of fundamental microscopic models. I will discuss some of the current efforts in realizing quantum simulators for cold bosonic and fermionic systems and how the theory tries to caught up with the experiment in making reliable predictions for strongly interacting quantum matter.

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