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Ultracold Atomic Gases: from Bose-Einstein Condensation to Quantum Simulation

Quantum theory is the essential tool to describe microscopic particles such as electron, atom, and molecule.
One of the most important questions in modern physics is what happens if we consider a system that consists of a number of microscopic particles obeying quantum theory.
This is called quantum many-body problem and is the common problem ranging from elementary particle to condensed matter physics.
Ultracold atomic gases have attracted attention for research on a quantum many-body problem since the first realization of a Bose-Einstein condensate in 1995.
In this talk, I review elements of ultracold atomic gases and the recent progresses such as quantum simulation.