

Quantum simulation with ultracold atoms in optical lattices

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Ultracold atoms, which are gaseous atoms cooled to the quantum regime by laser cooling and evaporative cooling, provide ideal platforms to study many-body quantum systems. Especially, such atoms loaded into in periodic potential (optical lattice) created by laser beams can be used to “simulate” fundamental condensed-matter models, such as the Hubbard model or the Heisenberg spin model. In this talk I explain ultracold atoms in optical lattices as a quantum simulator. I also report recent activities of our experiments with bosonic Rb atoms towards quantum simulation.

Primary author: Dr FUKUHARA, Takeshi (RIKEN CEMS)

Presenter: Dr FUKUHARA, Takeshi (RIKEN CEMS)

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