

JITCP Seminar

THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
[Friday afternoon, 2 pm, In Person]

Quantum simulation of strongly interacting Fermi gases and topological states of matter using ultracold atoms

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Ultracold gases are known as one of the ideal quantum simulation platforms. I will introduce two types of systems that have been simulated by ultracold gases.

Ultracold gases have been used to simulate the strongly interacting fermi gases found in the nuclei and neutron stars. Because of the diluteness of the contact interaction between the atoms, the interaction could be parametrised by the scattering length. The thermodynamics across a wide temperature regime has been extracted in cold atom experiments. One of the important thermodynamic quantities is the contact, which is conjugate to the internal thermodynamic variable, the scattering length. I will introduce our calculations of the thermodynamics, includes the Tan contact, and discuss the connections with the cold atom experiments.

Ultracold gases have also been used to simulate topological states of matter. We will briefly go through some models that have been simulated in the cold atom experiments but are hard to attain in the solid state systems. For example, Hofstadter's butterfly and Laughlin's Hall cylinder do not appear in nature but could be simulated using cold atoms. We will discuss the transport properties and localization of the synthetic Hall cylinder and the experimental realization.

In Person Seminar

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Room 522, 5/F, Chong Yuet Ming Physics Building,
The University of Hong Kong

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Phone: 28592360, Fax: 25599152. Anyone interested is welcome to attend.