THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

SEMINAR

Simulating Dissipative Quantum Systems with Ultracold Fermi Gases

by

Professor Le LUO (羅樂教授)
School of Physics and Astronomy
Sun Yat-sen University, China

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ALL INTERESTED ARE WELCOME
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Abstract

Dissipation is a ubiquitous phenomenon in many quantum systems. It could be observed in the thermal regime as well as deep in the quantum one [1]. Such examples also include the damped Rabi oscillation of a dissipative two-level system and the decay of a metastable state with many-body interactions. Both cases can be experimentally studied by coupling a ultracold quantum gas to other degrees of freedom, either through the external field to introduce population loss, or by providing the atom-molecule resonance to surmount the free-state energy barrier. I will present our work of simulating dissipative quantum systems with optically-trapped ultracold atoms, including realizing Floquet parity-time symmetry breaking transitions by engineering time-periodic dissipation and coupling of ultracold noninteracting 6Li atoms [2], and three-body loss around a narrow s-wave magnetic Feshbach resonance of strongly interacting 6Li-6Li atoms [3]. From these two examples, I would discuss some fascinating and universal physics that could to be explored with dissipative quantum gases.

[1] Parametric cooling of a degenerate Fermi gas in an optical trap, Physical Review A 93, 041401(R) (2016).
[2] Observation of parity-time symmetry breaking transitions in a dissipative Floquet system of ultracold atoms, Nature Communications,10,855 (2019).
[3] Three-Body Recombination near a Narrow Feshbach Resonance in ^{6}Li, Phys. Rev. Lett., 120, 193402 (2018)

Enquiries: 3943 6303