学术报告

Bose Gases with Raman induced Spin-Orbit Coupling

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About the speaker:

B. S. 2002 School of Physics, Peking University, China
M. S. 2006 School of Physics, Peking University, China
Ph. D. 2010 School of Physics, Peking University, China
2010 - 2012 Postdoc, Institute for Advanced Study, Tsinghua University
2012 - 2014 Postdoc, INO-CNR BEC Center, University of Trento, Italy
Research interests
Currently, I focus on theoretical studies of various many-body problems in ultracold quantum gases, especially the following aspects: BEC-BCS crossover near a Feshbach resonance, polaron physics in strongly interacting fermion-fermion mixtures and boson-fermion mixtures, the effects of spin-orbit coupling in quantum gases, etc.

Abstract:

The remarkable realization of synthetic spin-orbit coupling in quantum gases is opening new perspectives in the study of many-body phenomena with ultracold atoms. In this talk, I present a perturbation approach to study the phase diagram of Raman coupled Bose gases at finite temperature. For weak Raman coupling, free energy is expanded in terms of Raman coupling strength up to the second order, where the coefficient is determined according to linear response theory. The equation of state for the stripe phase and the plane-wave phase are obtained in Popov approximation, and the first order transition between these two phases is investigated. As temperature increases, we find the phase boundary bends toward the stripe phase side in the most temperature region, which implies the ferromagnetic order is more robust than the crystalline order in presence of thermal fluctuations. This theoretical result qualitatively agrees with the recent experimental observation in rubidium atomic gases. A method to measure Raman susceptibility through the two-photon Bragg scattering experiment is also discussed

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