Lectures

Strongly Correlated Ultracold Fermions

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Lecture 1: 2015年12月18日(周五) 下午3:00-4:30
Lecture 2: 2015年12月21日(周一) 下午3:00-4:30
频标楼4楼报告厅

About the speaker:

A/Prof. Xia-Ji Liu is the ARC future fellow of Centre for Quantum and Optical Science, Swinburne University of Technology, Hawthorn, Australia. In 2001, Liu got her Ph.D. degree of Quantum Optics form Tsinghua University. Liu has made significant contributions in the overlapping areas of quantum optics, atomic and molecular physics, and condensed matter physics. Driven by fast-growing experimental capabilities in ultra-cold atoms, her research has resulted in the development of several important quantum theories of ultra-cold Fermi gases, Bose gases, and Bose-Fermi mixtures. These areas of research all have immediate experimental applications and great implications for future advanced technologies. Her career-long ISI citations and h-index are 2234 and 28, respectively.

Abstract:

A condensate of strongly correlated fermionic pairs as new type of matter shows novel superfluidity in cold-atom laboratories. Its observation will help solving lingering questions such as high-temperature superconductivity, which has widespread applications for magnets, sensors and energy-efficient transport of electricity. In quantitatively understanding new experimental results, quantum many-body theory is now facing severe challenges.

In this talk, I will introduce briefly the field of strongly correlated ultracold fermions and some recently developed theoretical techniques that are providing successful predictions in our group [1,2,3,4]. I will focus on quantum virial expansion and its applications.

References
[1]. Hui Hu, Peter D. Drummond, and Xia-Ji Liu, Nature Physics 3, 469 (2007).
[2]. Hui Hu, Xia-Ji Liu, and Peter D. Drummond, Phys. Rev. Lett. 98, 070403 (2007).
[3]. Xia-Ji Liu, Hui Hu, and Peter D. Drummond, Phys. Rev. Lett. 102, 160401 (2009).
[4]. Xia-Ji Liu, Phys. Rep.524, 37 (2013). on for more detailed theoretical investigations in order to test QED.

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