武汉物数所理论交叉学术交流系列报告

(第九十九期)

Spin excitations in atomic Fermi gases: from RF spectroscopy to optical atomic clocks

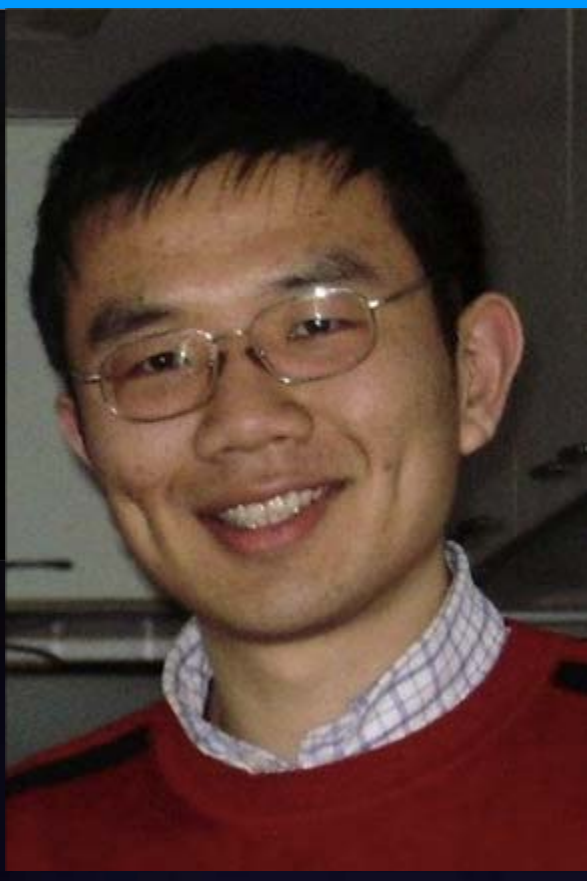
俞振华 副研究员

清华大学高等研究院

2014年09月18(周四) 上午10:30-12:00

频标楼4楼报告厅

About the speaker:



ACADEMIC DEGREES:

2003 B.S. (Physics) Fudan University, China.

2008 Ph.D. (Physics) University of Illinois at Urbana-Champaign, USA. (Advisor: Gordon Baym)

EMPLOYMENT HISTORY:

2008.9-2010.8 Postdoctoral fellowship,
the Niels Bohr International Academy,
the Niels Bohr Institute.

2010.9-2010.10 Visiting scholar,
Institute for Advanced Study, Tsinghua University.

2010.11-2011.10 Research assistant,
Physics Department, the Ohio State University.

2011.11-present Tenure-track associate member,
Institute for Advanced Study, Tsinghua University.

Abstract:

Internal states of atoms can be mapped to pseudo-spins. Excitations of such spins can reveal important interatomic interaction effects. However theoretical calculations of spin excitations requires self-consistency, namely maintaining all conservation laws. We show how a BCS self-consistent calculation can explain the RF spectroscopy experiment of unitary Fermi gas, which is meant to measure the microscopic pairing gap in the BEC-BCS crossover. We use sum rules to derive an analytic expression between the pairing gap and the mean frequency shift of the RF spectrum. We further discuss the effects of spin excitations on the collisional shift of optical atomic clocks.

主办单位:武汉物数所理论与交叉研究部