



International Center for Quantum Materials, PKU

Weekly Seminar

Theory of electromagnetically induced transparency in strongly correlated quantum gases



Daw-Wei Wang

Physics Department, National Tsing-Hua University, Hsinchu, Taiwan

Time: 4:00pm, July 9, 2013 (Tuesday)

时间: 2013年7月9 (周二) 下午4:00

Venue: Conference Room 607, Science Building 5

地点: 理科五号楼607会议室

We develop a general theory to study the electromagnetically induced transparency (EIT) in ultracold quantum gases, applicable for both Bose and Fermi gases with an arbitrary interparticle interaction strength. We show that, in the weak probe field limit, the EIT spectrum is solely determined by the single-particle Green's function of the ground-state atoms, and reflects interesting quantum many-body effects when atoms are virtually coupled to the low-lying Rydberg states. As an example, we apply our theory to a one-dimensional Luttinger liquid, a Bose-Mott insulator state, and the superfluid state of two-component Fermi gases, and show how the many-body features can be observed nondestructively in the unconventional EIT spectrum.

Daw-Wei Wang got his B.S. in Physics from National Tsing-Hua University, Hsinchu, Taiwan in 1995 and his Ph.D in Theoretical Physics from University of Maryland in 2000. From 2010 to present, he has been a professor in Department of Physics, National Tsing-Hua University. His research is mainly to develop theories in different strongly correlated many-body systems, including ultracold atoms/molecules, quantum Hall systems, one dimensional systems, and (high T_c) superconductivity, etc. In recent years he is mostly working in the many-body theory of ultracold atoms, especially about the ground state properties, low energy excitations, localization effects, Bose-Fermi mixture, and quantum dynamics.

Enquiry: wubiao.phys@gmail.com