凝聚态物理与北京大学论坛

7 期

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Quantum phase transitions of a many-body system at zero temperature are characterized by the change of the ground state properties as model parameter g in the system Hamiltonian H(g) is varied across the transition point. People think that structures of the ground-state wavefunction become qualitatively different across the transition point. That is, if we calculate the fidelity, a concept emerging from quantum information theory, between two ground states separated by small distance in parameter space, it should show a minimum around the critical point due to the relatively larger distance at that point. This primary observation has motivated many people to explore the role of quantum fidelity in critical phenomena in recent years. In this talk, I will introduce the quantum fidelity approach to quantum phase transitions based on its leading term, i.e. the fidelity susceptibility. The fidelity susceptibility denotes the adiabatic leading response of the ground state to the driving parameter. Differ from traditionally approach based on the ground-state energy, the fidelity susceptibility shows distinct scaling and singular behaviours around the critical point. I will present also the ground-state fidelity approach to both Landau's phase transition and topological phase transition, as illustrated by the Lipkin-Meshkov-Glick model and the Kitaev honeycomb model, respectively.

四）15:00—16:40

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