Title: Energetics of three particles at a three-body resonance

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Time: 4:00pm, Wednesday, Dec 30, 2015  
(3:30~4:00pm, Tea, Coffee, and Cookie)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

Ultracold atoms, by definition, have tiny collision energies. It is then natural to develop a systematic perturbation theory in which the collision energy, rather than the interaction potential, is treated as a small parameter. One can expand the N-body wave function in powers of the energy. In this talk I will illustrate this general idea with the three-body system at a three-body resonance, where there is a three-body bound state with zero binding energy. The most important effective three-body parameter at such a resonance is a quantity which we call three-body effective range. If such a system is placed inside a LARGE cubic box with side length L, and the periodic boundary condition is imposed, one would expect a low energy state whose energy goes to zero faster than 1/L^2 at large L. To our surprise, however, there seems to be TWO such low energy states. Their energies both scale like 1/L^3. The theory discussed here is relevant to both ultracold atomic physics and low-energy nuclear physics.