



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
COLLOQUIUM

Recent Developments and Grand Challenges in Cold Atom Physics

by

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Date: February 25, 2011 (Friday)

Time: 4:00 - 5:00 p.m.

Place: L2, Science Centre, CUHK

(Light refreshments will be served 20 minutes prior to the colloquium.)

ALL INTERESTED ARE WELCOME

Abstract

The realization of Bose-Einstein condensate in laboratories in 1995 opened the door for physicists to explore a new world that is as cold as a few nanoKelvin. Within less than twenty years, physicists have made many exciting achievements in the studies of cold atoms. In my talk I will give an introduction on some of these developments, including condensates of both bosons and paired fermions, and novel many-body phases in optical lattices. These developments are closely related to a number of unique properties of cold atoms, such as high controllability in experiments and exactly known microscopic physics for theorists.

On the other hand, there are also grand challenges in current frontiers of cold atom physics. The first challenge is that the required temperatures for studying strongly correlated physics in optical lattices are far below those achievable in laboratories today. The second problem concerns the fact that many important thermodynamic qualities are inaccessible by standard imaging methods. I will discuss recent proposals on how to overcome these challenges and fulfill the lofty goal of physicists to explore many-body effects and strong correlations in cold atoms.