

Joint CQSE and CASTS Seminar

Weekly Seminar
Nov. 3, 2017 (Friday)

TIME Nov. 3, 2017, 14:30 ~ 15:30
TITLE Synthetic spin-orbit coupling
SPEAKER Prof. Gediminas Juzeliūnas
Institute of Theoretical Physics and Astronomy, Vilnius
University, Lithuania
PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

Spin-orbit coupling (SOC) manifests in classical and quantum systems. Currently there is a great deal of activities in studying the synthetic SOC for ultracold atom and photonic systems. Following a background material on the SOC we shall discuss some recent developments in the area. One of current challenges is to experimentally produce a two-dimensional (2D) SOC of the Rashba type, as well as a three dimensional Weyl SOC. We shall discuss a novel way of creating the 2D SOC using ultracold atoms confined in a bilayer structure. It appears that an interplay between the inter-layer tunneling, intra-layer Raman coupling and intra-layer atom-atom interaction gives rise to an effective 2D SOC providing a diverse ground-state configurations for bilayer Bose-Einstein condensates (BEC) and degenerate Fermi gases. We shall also discuss some other recent work in the area, including the magnetically generated spin-orbit coupling.

