Joint CQSE and CASTS Seminar

Weekly Seminar
Jun. 9, 2017 (Friday)

TIME Jun. 9, 2017, 14:30 ~ 15:30
TITLE Nonadiabatic processes for spin-pumping in quantum channels and for valley-dependent transmission in graphene
SPEAKER Prof. Chon-Saar Chu
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Abstract

Nonadiabatic processes in electron transmission through a time-modulated region could, by its own nature, be sensitive to resonant inelastic processes. We investigate the role of such processes in two situations: in quantum channels for spin-pumping [1], and in collimated injection in graphene for valley-dependent transmissions [2]. The spin-pumping in quantum channels is caused by the interplay between two gate-induced ac agents, namely the gate-induced ac potential field and the gate-induced ac spin-orbit field. Both perturbative and full sideband-process approaches were used for the illustration of the physical mechanism and its resonant side-band nature. The valley-dependent transmission is shown to arise from the interplay between the gate-induced ac potential field and the asymmetric injection towards the time-modulated region. Both collimation and trigonal-warping effects are important for the breaking of the valley symmetry.

References:

[1] Physical Review B 95, 075406 (2017).
[2] Physical Review B 88, 195419 (2013).