

Joint CQSE and CASTS Seminar

Weekly Seminar
May 12, 2017 (Friday)

TIME May 12, 2017, 14:30 ~ 15:30
TITLE Quasi-low-dimensional electron gas with one populated band as a testing ground for time-dependent density-functional theory of mesoscopic systems
SPEAKER Prof. Vladimir Nazarov
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PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

We find an exact analytical solution to the exchange-only time-dependent density-functional theory (TDDFT) problem for a significant class of quasi-low-dimensional (QLD) materials: QLD electron gas with only one band filled in the direction perpendicular to the layer or wire. The theory yields the TD exchange potential as an explicit nonlocal operator of the TD spin-density. The dressed interband (image states) excitation spectra of Q2DEG are obtained, while the comparison with the Kohn-Sham (KS) transitions provides insights into the qualitative and quantitative role of the many-body interactions. Important cancellations between the Hartree f_H and the exchange f_x kernels of TDDFT are found in the low-density regime, elucidating the interrelations between the KS and the many-body dynamics in mesoscopic systems.

