CRETE CENTER FOR QUANTUM COMPLEXITY AND NANOTECHNOLOGY

UNIVERSITY OF CRETE
DEPARTMENT OF PHYSICS

CAPACITIES

ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 14 December 2017

17:00 -18:00

3rd Floor Seminar Room

"Electrical and optical properties of 1D and 2D materials from a microscopic modelling"

Prof. Vasili Perebeinos

Center for Photonics and Quantum Materials, Skoltech, Russia

Abstract

In recent years, 1D and 2D materials, such as carbon nanotubes and transition metal dichalcogenides, have attracted much attention due to their excellent transport and optical properties. Using a Bethe-Salpeter equation, we investigate optical and excitonic properties of MoS2 monolayers in an applied in-plane electric field [1]. We predict a quadratic Stark shift and its scaling with the exciton binding energy, determined by the dielectric environment. I will also discuss electrical contacts in 1D carbon nanotubes [2] and the role of electronic structure modifications caused by the nanotube deformations due to the metal wetting [3].

[1] B. Scharf, T. Frank, M. Gmitra, J. Fabian, I. Zutic, and V. Perebeinos, Phys. Rev. B 94, 245434 (2016).
[2] V. Perebeinos, J. Tersoff, and W. Haensch, Phys. Rev. Lett. 111, 236802 (2013).
[3] R. Hafizi, J. Tersoff, and V. Perebeinos, Phys. Rev. Let. 119, 207701 (2017).