東北大学

第 66 回ナノ・スピン工学研究会

－テラヘルツ波帯グラフェンデバイス－

日時： 2013 年 3 月 14 日(木) 15:00－18:00

場所： 東北大学　電気通信研究所　ナノ・スピン研究棟　5 階　A508 室

〒980-8577　仙台市青葉区片平２－１－１

言語： 英語

プログラム：

3/14
15:00-16:00 **“Prospects of silicon ULSI” (in English)**
Dr. Vladimir VYURKOV, RIEC Visiting Professor
(Leading Researcher, Institute of Physics and Technology, RAS, Moscow, Russia)

Silicon remains the basic material for integrated circuits. For advance into smaller size of transistors it is necessary to employ thin undoped (depleted) channels wrapped by gates. The speed of processors is restricted by heating, therefore, low-power transistors are challenging. Tunnel transistors look as promising. The technology of quantum computers may also inherit advances in silicon nanoelectronics. The motion of carriers in the channel of a nanotransistor is similar to the propagation of waves in the waveguide; the self-consistent solution of the Schroedinger and Poisson equations is required for simulation.

16:00-17:00 **“Some approaches to the solution of equations of mathematical physics” (in English)**
Dr. Igor SEMENIKHIN, RIEC Visiting Associate Professor
(Senior Researcher, Institute of Physics and Technology, RAS, Moscow, Russia)

Various approaches to the solution of equations of mathematical physics are considered in the presentation. In particular the finite-difference method, the spectral method and the pseudo spectral method as well as the Monte Carlo method for the solution of partial differential equations and eigenvalue problem are discussed. The advantages and disadvantages of these approaches are explored for the particular systems. Examples of solutions of the Maxwell's equations, and the Schrödinger equation for some physical systems are presented.

17:00-18:00 **“Transport in graphene: quantum, relativistic, and simple” (in English)**
Dr. Dmitry SVINTSOV, RIEC Visiting Research Fellow
(Engineer, Institute of Physics and Technology, RAS, Moscow, Russia)

Graphene, a two-dimensional crystal of graphite, is sometimes called a ‘desktop particle accelerator’ due to its ultrarelativistic electronic spectrum. Today’s papers on graphene transport are a bizarre mixture of relativism, quantum electrodynamics, and strongly correlated systems. It will be shown that strong interparticle interaction allows an ultimately simple *hydrodynamic* description of transport in graphene. Some applications of the developed model to simulation of graphene based devices will be demonstrated.

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