東北大学

第 71 回ナノ・スピン工学研究会

ーテラヘルツ波帯グラフェンデバイスｰ

日時： 2014 年 5 月 15 日(木) 14:00ー17:00

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ー１ー１

言語： 英語

プログラム：

5/15
14:00-15:30

"Introduction to numerical methods for the solution of Maxwell's equations" (in English)
Dr. Igor SEMENIKHIN, RIEC Visiting Associate Professor
(Senior Researcher, Institute of Physics and Technology, RAS, Moscow, Russia)

Over the past decades an increasing interest has been devoted to the rigorous solution of Maxwell's equations in order to study the optical properties of optoelectronic devices including image sensors, nanostructured solar cells, photonic crystals and diffraction gratings. Such structures exhibit geometrical dimension comparable or even smaller than the radiation wavelengths, therefore the solution of Maxwell's equations is required. To date a large number of algorithms have been developed to solve Maxwell's equations for the analysis of these structures. Among them, the algorithms based on eigenmode expansion are widely used. The presentation will focus special attention on the Fourier modal method (FMM) also known as Rigorous Coupled-Wave Analysis method (RCWA). Some other modal methods including Polynomial expansion modal method and Analytic modal method will also be discussed.

15:30-17:00

"Tunneling in semiconductors and graphene" (in English)
Dr. Dmitry SVINTSOV, JSPS Postdoctoral Fellow
(Researcher, Institute of Physics and Technology, RAS, Moscow, Russia)

Tunneling in semiconductors much differs from free electron tunneling and is quite similar to Schwinger's mechanism of electron-positron vacuum breakdown. Despite such pure science analogy, this phenomenon finds its applications in common devices – lasers, microwave generators, and flash memories. Absence of band gap in graphene allows almost unimpeded electron tunneling between valence and conduction bands. This effect (called sometimes 'Klein paradox') is actually a killer of all logic device applications of graphene. Recent advances in layered heterostructures composed of graphene, boron nitride, and transition metal chalcogenides start a new age in the evolution of graphene-based tunneling devices.

お問合せ先：東北大学　電気通信研究所
ブロードバンド信号処理研究室
助教　佐藤　昭
TEL: 022-217-6108
Email: a-satou@riec.tohoku.ac.jp