

第 94 回ナノ・スピン工学研究会・通研講演会の開催について

日時:2017 年 11 月 17 日(金) 13:30~15:00

場所:電気通信研究所 ナノ・スピン総合研究棟 5 階 A508 室

講演題目:「グラフェンを中心とする二次元原子薄膜ヘテロ構造とそのテラヘルツ応用」

講師:ミティン ウラジミール(MITIN, Vladimir)アメリカ・ニューヨーク州立大学バッファロー校 Distinguished Professor

講師紹介:Dr. Vladimir Mitin is a SUNY Distinguished Professor at the Department of Electrical Engineering, University at Buffalo, the State University of New York (SUNY), NY, USA. He is a Fellow of IEEE, APS, AAS, IoP, and SPIE. He is now visiting RIEC, Tohoku University, as a Visiting Professor. His research interests include: Nanoelectronic, Microelectric and Optoelectronic Devices and Materials; Transport and Noise in Heterostructures, Quantum Wells and Quantum Wires; Material Characterization; Heat Dissipation in Low-Dimensional Structures and Devices; Numerical Simulation of Lasers, Photodetectors, Terahertz Generators and Detectors. He has authored and coauthored more than 250 peer-reviewed scientific journal papers, 10 books, and holds 14 patents.

講演概要: We review our recent work on van der Waals (vdW) heterostructures THz and infrared photodetectors (PD) that are based on atomically thin graphene layers (GLs) separated by a few atomic layers dielectric (like h-BN, WS₂, InSe and others). We have proposed and developed the theory of linear and nonlinear response of the vdW GL-PD where electrons from the valence band of GLs absorb radiation and go to the continuum states above the inter-GL barriers. Both the periodic selective doping of the inter-GL barrier layers and the GLs doping lead to a pronounced variation of the GL-PD spectral characteristics. The doping "engineering" opens wide opportunities for the optimization of the GL-PDs for operation in different parts of radiation spectrum from the near infrared to the THz range. The new GL-PD can operate at elevated temperatures and their high responsivity and detectivity have advantages over the quantum well photodetectors.

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The 94th Nano-Spin Engineering Seminar & RIEC Distinguished Lecture

*Date:*17th November, 2017. (Friday)

*Time:*13:30 ~ 15:00

*Place:*A508, RIEC Nano-Spin Laboratory Building, Katahira-Campus

Title of Lecture:"Graphene-Based Atomically-Thin 2D Heterostructures and their Terahertz Applications"

Lecturer: Dr. Vadimir MITIN, Distinguished Professor, University at Buffalo, SUNY, NY, USA

*Introduction of Lecturer:*Dr. Vladimir Mitin is a SUNY Distinguished Professor at the Department of Electrical Engineering, University at Buffalo, the State University of New York (SUNY), NY, USA. He is a Fellow of IEEE, APS, AAS, IoP, and SPIE. He is now visiting RIEC, Tohoku University, as a Visiting Professor. His research interests include: Nanoelectronic, Microelectric and Optoelectronic Devices and Materials; Transport and Noise in Heterostructures, Quantum Wells and Quantum Wires; Material Characterization; Heat Dissipation in Low-Dimensional Structures and Devices; Numerical Simulation of Lasers, Photodetectors, Terahertz Generators and Detectors. He has authored and coauthored more than 250 peer-reviewed scientific journal papers, 10 books, and holds 14 patents.

Abstract:*We review our recent work on van der Waals (vdW) heterostructures THz and infrared photodetectors (PD) that are based on atomically thin graphene layers (GLs) separated by a few atomic layers dielectric (like h-BN, WS₂, InSe and others). We have proposed and developed the theory of linear and nonlinear response of the vdW GL-PD where electrons from the valence band of GLs absorb radiation and go to the continuum states above the inter-GL barriers. Both the periodic selective doping of the inter-GL barrier layers and the

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