

**April 19, 2016, 5:30pm – 6:30pm,  
RIT Inn & Conference Center, 5257 W. Henrietta Rd. Rochester, NY 14467**

**2016 IEEE JCM  
Rochester Section Joint Microwave Theory and Techniques &  
Antennas and Propagation Society presents:**

*Plasmonic Enhancement of Graphene Heterostructure  
Based Terahertz Detectors*

By:

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**Abstract:**

Among different carbon allotropies (diamond, graphite, fullerene, carbon nanotubes and graphene), graphene and more complex graphene-based structures attract a considerable attention now. The gapless energy spectrum of graphene implies that graphene can absorb and emit photons with rather low energies corresponding to terahertz (THz) and infrared (IR) frequencies. In this presentation, the discussion is focused on the double-graphene-layer (D-GL) structures where two GLs are separated by a barrier layer (Boron Nitride, Silicon Carbide, and so on). The spectrum of the plasma oscillations in the D-GL structures falls into the THz range of frequencies and can be effectively controlled by the bias voltage. We review recent advances in D-GL plasmon heterostructures for terahertz (THz) detectors. When the band offset is aligned to the THz photon energy, the D-GL structure can mediate photon-assisted resonant tunneling through a thin tunnel barrier layer separating the GLs, resulting in the resonant detection of the THz radiation. The cooperative double-resonant excitation with structure-sensitive graphene plasmons gives rise to extremely high gain and/or responsivity in the THz detectors. The major part of the talk is based on the works made in collaboration with V. Ryzhii, T. Otsuji, V. Ya. Aleshkin, A. A. Dubinov, M. Ryzhii, and M. S. Shur.

**Biography:**

Dr. Vladimir Mitin obtained his Doctor of Science degree in 1987 from the Institute of Semiconductors of Ukrainian Academy of Sciences in Kiev, Ukraine. He is currently a SUNY Distinguished Professor at the Department of Electrical Engineering at the University at Buffalo, The State University of New York. He was the Chair of that Department for two terms: 2003-2006 and 2006-2009. Dr. Mitin is a fellow of IEEE, SPIE, APS, AAAS, and IoP. Additionally, from 1993-2003, Dr. Mitin was a Professor in the Department of Electrical and Computer Engineering at Wayne State University in Detroit, Michigan.

Professor Mitin's fields of specialization are nanoelectronic, microelectronic and optoelectronic devices and materials. Currently he is working in the areas of design and characterization of electronic and optoelectronic devices with emphasis on light absorption and emission, energy conversion and heat dissipation. Special attention in his research is now placed on simulation, design, and characterization of nanosensors, and quantum dot infrared photodetectors and solar cells. He has more than 230 publications in refereed journals, fourteen patents, four monographs and five textbooks.

**Event Registration:**

Registration is not required, but is appreciated:

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