

Tohoku University
RIEC Seminar
38th Nano-Spin Engineering Workshop
- Nanotechnology for Terahertz Measurement & Instrumentation

Date&Time: July 28th (TUE), 2009, 10:00 am - 11:50 am

Venue: Conference Room, Nano-Spin Laboratory Building 4F
RIEC: Research Institute of Electrical Communication, Tohoku University
2-1-1, Katahira, Aoba-ku, Sendai, 980-8577 Japan

Program:

10:00 - 10:45 "Terahertz time-domain spectroscopy -an original way to explore the far infrared spectrum of nanostructures/materials"

Professor Jean-Louis Coutaz

Microwave and Characterization Laboratory (LAHC), University of Savoie, France

ABSTRACT: Terahertz time-domain spectroscopy (THz-TDS) has now got wide popularity in terms of well organized full-wave characterization method in the terahertz frequency domain. This talk will review the fundamental basis and important aspects of THz-TDS for characterization of nanostructures of semiconductor/dielectric/metallic materials. The topics cover: electrooptic effects, photoconductive effects, sampling techniques in optics, nonlinear optics, generation/detection of terahertz radiation, THz-TDS instrumentation, case study of measurements for various structures/materials, and future trends.

11:00 - 11:15 (Coffee Break)

11:00 - 11:45 "Field Effect Transistors for Terahertz Detection: Physics and First Imaging Applications"

Visiting Professor Wojciech Knap

RIEC, Tohoku university, on leave from CNRS, Montpellier, France

ABSTRACT: Resonant frequencies of the two-dimensional plasma in FETs increase with the reduction of the channel dimensions and can reach the THz range for sub-micron gate lengths. Nonlinear properties of the electron plasma in the transistor channel can be used for the detection and mixing of THz frequencies. At cryogenic temperatures resonant and gate voltage tunable detection related to plasma waves resonances, is observed. At room temperature, when plasma oscillations are overdamped, the FET can operate as an efficient broadband THz detector. We present the main theoretical and experimental results on THz detection by FETs in the context of their possible application for THz imaging.

11:45 - 11:50 Closing

Organizer: RIEC Nano-Spin Engineering Workshop Committee, Tohoku University

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