

「テラヘルツの物理とナノエレクトロニクス」に関するセミナーのご案内

各位、

時下ますますご清祥のこととお慶び申し上げます。

日本学術振興会海外招へい研究者として本学に滞在中の電気通信研究所客員教授：Wojciech KNAP 博士を講師として、以下の日程で「テラヘルツの物理とナノエレクトロニクス」に関するセミナーを開催することとなりました。目覚ましい進展を遂げている本分野の基礎から研究の最前線までを初学者にもわかりやすくご講演いただく予定です。つきましては、本分野にご興味をお持ちの学生、研究者、教職員の皆様におかれましては、多数ご参加をいただきますよう、お願い申し上げます。

講師：Visiting Prof. Wojciech KNAP, JSPS Research Fellow

言語：英語

会場：電気通信研究所ナノ・スピン棟実験施設 5階大会議室

第1回：

2008年7月24日(木) 15:00～16:00

「Terahertz Science and Technology - Solid State Physics」

Sub-title: Terahertz and magnetotransport investigations of the conduction band energy spectrum of two dimensional electrons: example of GaN/AlGaIn heterojunctions

第2回：

2008年7月28日(月) 15:00～16:00

「Terahertz Science and Technology - Terahertz Nano-Transistors」

Sub-title: Terahertz plasma excitations and ballistic limits of nanometer gate length field effect transistors

本件問合せ先：

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**Summer Seminar concerning:
"Terahertz Science and Technology: Physics and Nano-electronics"**

Dear all the colleagues:

This is to announce a Summer Seminar concerning "Terahertz Science and Technology: Physics and Nano-electronics" scheduled on July 24th and 28th in series. The seminar is lectured by Visiting Professor Dr. Wojciech KNAP, who is now staying at RIEC as a JSPS Foreign Research Fellow during his sabbatical leave from the CNRS, Montpellier, France. From the fundamental physical basis to the cold cuts of their research and development will be presented with highest care for graduate/undergraduate students to be well understood. The organizer will cordially invite all the students, researchers and staffs who have interest on this peculiar field to participate in.

Lecturer: Visiting Prof. Wojciech KNAP, JSPS Research Fellow

Location: RIEC Nano-Spin Building, Large meeting room

The 1st: 3:00PM – 4:00PM on Thursday, July 24th, 2008

「Terahertz Science and Technology - Solid State Physics」

Sub-title: Terahertz and magnetotransport investigations of the conduction band energy spectrum of two dimensional electrons: example of GaN/AlGaN heterojunctions

Abstract: The experimental methods to determine the basic conduction band parameters of a two dimensional electron gas (2DEG) are presented on the example of GaN/AlGaN heterojunctions. Two main experiments are reported. First, we describe the terahertz absorption experiments using a fast-Fourier-transform spectrometer coupled with a 24-T Bitter magnet system. We show how one can accurately measure the effective mass for the samples with different carrier concentrations. Second, low temperature (300mK) magnetotransport measurements in tilted magnetic fields are presented focussing on the Quantum Hall Effect and Shubnikov-de Haas oscillations. The electron "g" factor determining the conduction electron spin splitting was found by the "tilted magnetic field" method. Those experimental methods allow us to determine the g-factor and the effective mass as a function of the density of 2DEG.

The 2nd: 3:00PM – 4:00PM on Monday, July 28th, 2008

「Terahertz Science and Technology - Terahertz Nano-Transistors」

Sub-title: Terahertz plasma excitations and ballistic limits of nanometer gate length field effect transistors

Abstract: The channel of nanometre field effect transistor (FET) can act as a resonant cavity for plasma waves. The plasma-wave frequency is in the terahertz (THz) range and can be tuned by the gate length and the gate bias. During the last few years THz detection/emission related to plasma wave instabilities in nanometer size FETs was demonstrated experimentally. In this work we review the recent results on sub-THz and THz detection by 50-300nm gate length III-V HEMTs and Si MOSFETs. We present experimental results on the resonant and nonresonant (overdamped) plasma wave detection/emission, and discuss possible applications and most important problems to be solved. Also magnetotransport experiments showing physical limits of Si nanotransistors due to ballistic motion of the carriers are presented.

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