49th RAP Seminar

The 49th Seminar on RIKEN Center for Advanced Photonics

Language: Japanese

Date: **Jan.19 (Fri) 16:00 - 17:00, 2018**

Location: **W319, 3F, Cooperation Center, Wako Campus, RIKEN**

(理研 和光キャンパス 研究交流棟 3階会議室 W319)

Title: **Visualization of non-equilibrium electrons on nanoscales: Scanning noise microscopy**

非平衡電子のナノスケール画像化：挿引雑音顕微鏡

Speaker: **Prof. Susumu KOMIYAMA**

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Most matter is composed of positive and negative charge particles, and the charge particles cannot be at rest but fluctuate except at absolute zero temperature. If the system is in thermal equilibrium, fluctuation (Nyquist noise) is thermally activated. If the system is out of equilibrium, the current fluctuation (excess noise or shot noise) brings novel and nontrivial information of local charge dynamics in non-equilibrium phenomena.

A novel scanning noise microscope (SNoiM) is described, with which ultra-high frequency current noise (15~30 terahertz) is locally probed and mapped with nanometer resolution (20 nm). A sharp metal tip scatters electromagnetic evanescent fields generated by the current fluctuation, and the scattered waves are detected with a terrahertz confocal microscope. Measurements at room temeperature have been made on (i) nanostructured metal layers in thermal equilibrium, (ii) narrow metal wires under non-uniform Joule heating, and (iii) hot electrons in GaAs nano devices, which disclose non-local Joule heating.

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