Hirakawa Group

[Terahertz Nanoscience]

Nanoscience Center for Photonics, Electronics, and Materials Engineering

Quantum Semiconductor Electronics

Department of Electronic Engineering and Information Systems

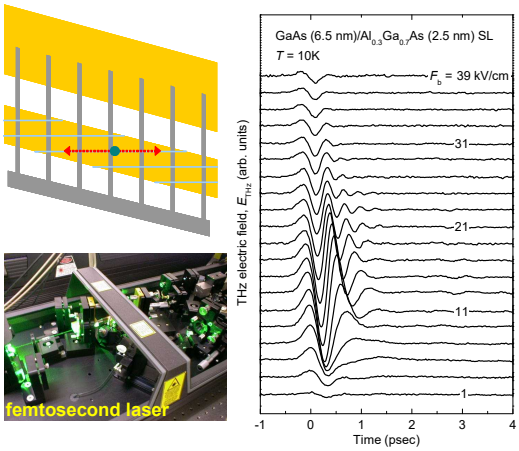
https:// thz.iis.u-tokyo.ac.jp

Quantum nanophysics and its device applications

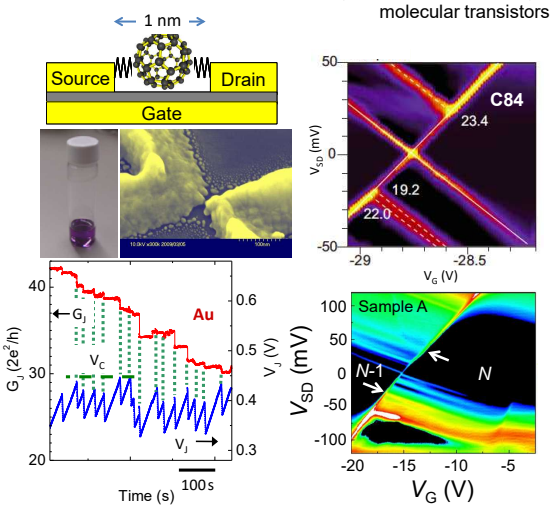
Various intriguing physics shows up in quantum nanostructures owing to size quantization and electron-electron interaction effects. We investigate novel physics in such quantum nanostructures and explore their device applications.

- Carrier dynamics and device applications of quantum nanostructures in the THz range
- Nanoscience for single molecular transistors
- Novel high-sensitivity, fast terahertz detectors using MEMS resonators
- Thermionic cooling effect in semiconductor heterostructures

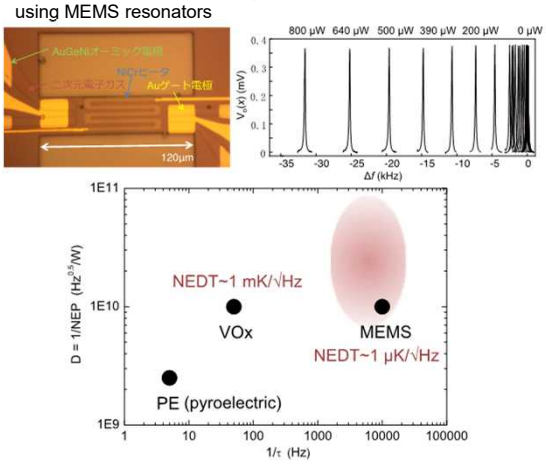
Bloch oscillation in semiconductor superlattices and its application to THz oscillators



Fabrication of atomic-scale nanogap electrodes and single molecular transistors



Development of uncooled, high-sensitivity terahertz detectors using MEMS resonators



Thermionic cooling in semiconductor heterostructures