CPEC/LIMMS

# Hirakawa Group

## [Quantum nanophysics and its device applications]

**Center for Photonics Electronics Convergence**

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

**Quantum Semiconductor Electronics**

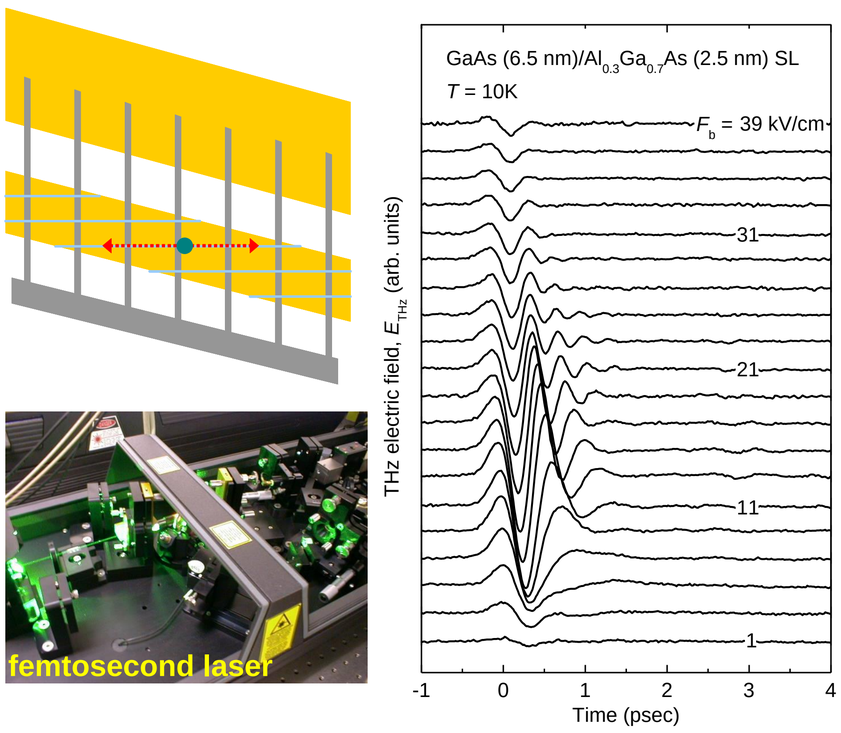
Department of Electronic Engineering and Information Systems

## Quantum nanophysics and its device applications

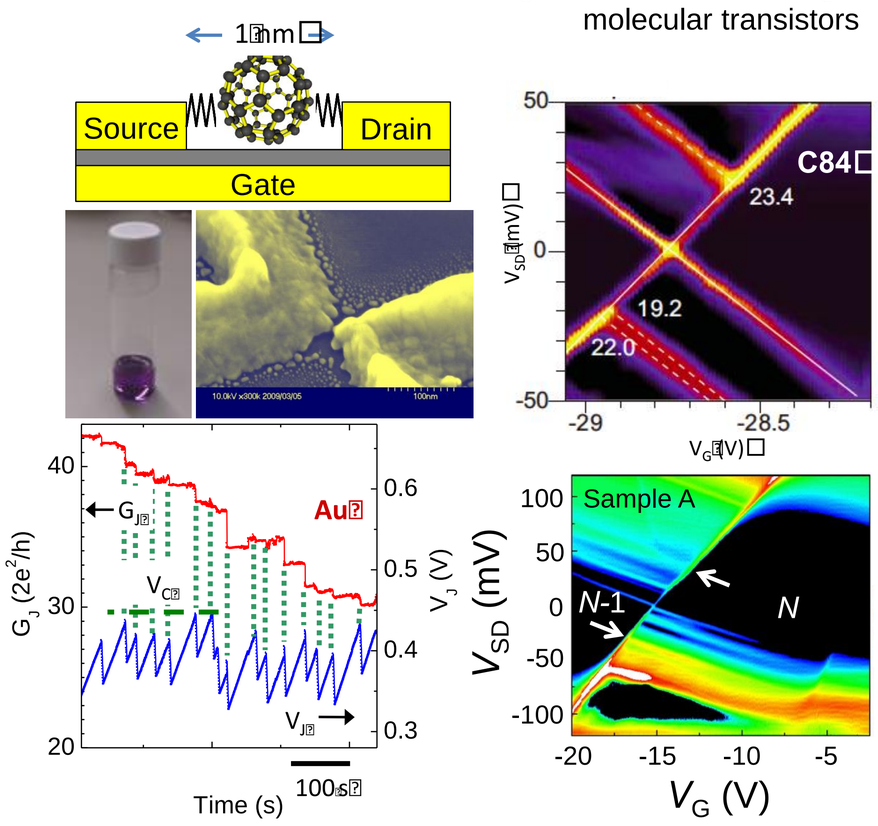
Various intriguing physics shows up in quantum nanostructures owing to size quantization and electron-electron interaction effects. We investigate novel physics in such quantum nanostructures and explore their device applications.

- Carrier dynamics and device applications of quantum nanostructures in the THz range
- Physics and applications of single quantum dot transistors
- Nanoscience for single molecular transistors
- Molecular beam epitaxy of semiconductor quantum structures and nanofabrication technologies

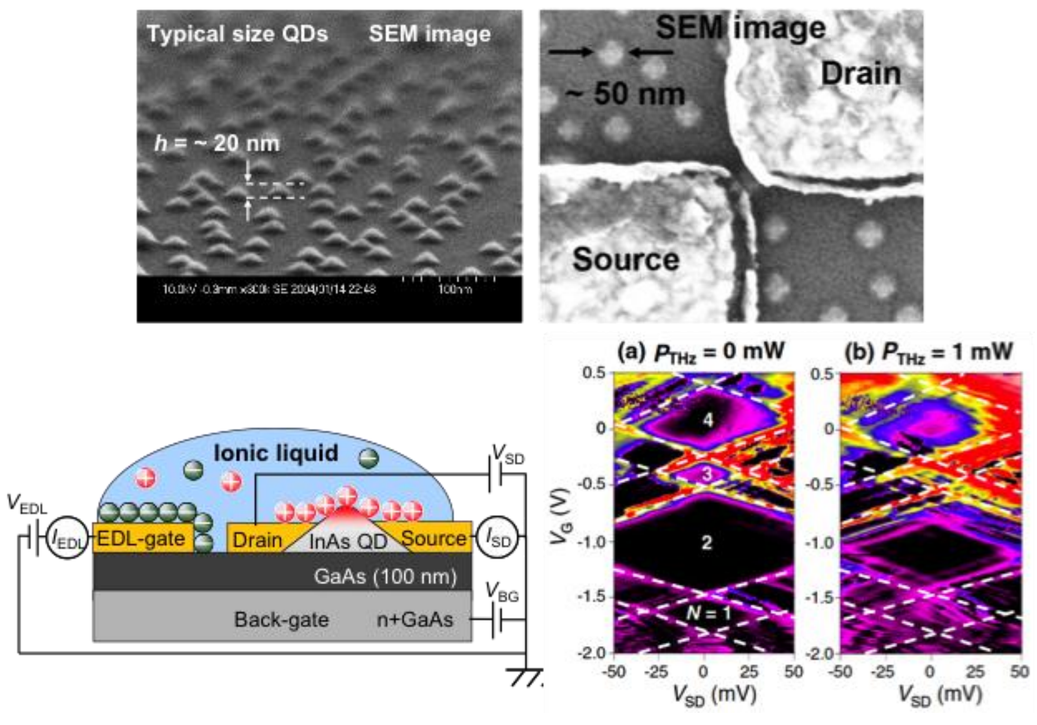
Bloch oscillation in semiconductor superlattices and its application to THz oscillators




Fabrication of atomic-scale nanogap electrodes and single molecular transistors




Physics and applications of single quantum dot transistors




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