

CPEC

# Hirakawa Group

## [Quantum nanophysics and its device applications]

Center for Photonics Electronics Convergence

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

### Quantum Semiconductor Electronics

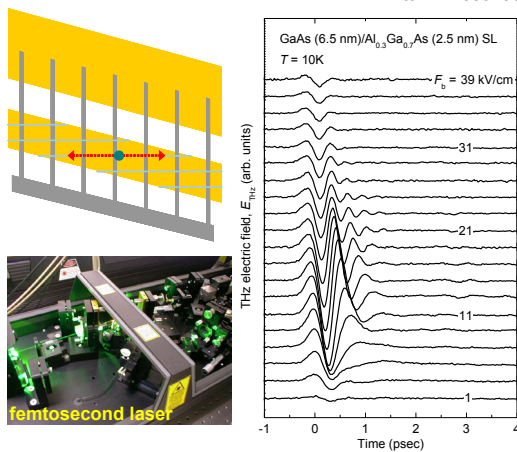
Department of Electronic Engineering and Information Systems

## Quantum nanophysics and its device applications

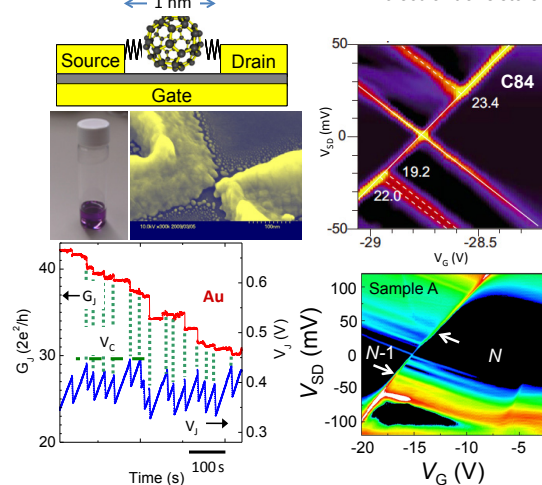
Various intriguing physics shows up in quantum nanostructures owing to size quantization and electron-electron interaction effects. We investigate novel physics in such quantum nanostructures and explore their device applications.

- 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

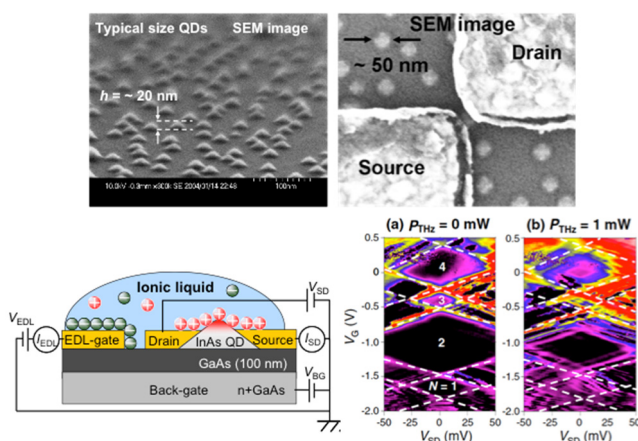
Bloch oscillation in semiconductor superlattices and its application to THz oscillators



Fabrication of atomic-scale nanopap electrodes and single molecular transistors



Physics and applications of single quantum dot transistors



Crystal growth of quantum nanostructures by molecular beam epitaxy

