

# Machida Lab.

## [Electron in nano]

Department of Fundamental Engineering

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

Semiconductor quantum spintronics

Department of applied physics  
School of Engineering

## Electrons and spins in nano-structure

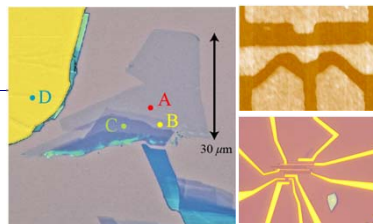
The electrons in the nano-device exhibit very different behavior. By combining material science (graphene, semiconductor, oxide), nano-fabrication, and low temperature ( $\sim 10$  mK) measurement, we explore the science and the engineering of nano-Spintronics.



RF probe station

### Graphene

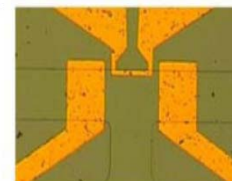
Quantum transport in Dirac fermion.



EB lithography system

### Nuclear spins in semiconductor

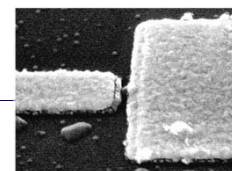
Quantum information processing with nuclear spins in semiconductor.



10 mK Dilution refrigerator

### Quantum dot spin-SET

Spin single electron transistor (spin-SET) based on nanogap electrode and self-assembled InAs quantum dot (QD).



### Oxide nano-wire

Physics of correlated electrons in oxide nano-wire

