Novel Functional Devices Exploiting Electron Spins in Solids

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Semiconductor Devices Controlling Electronic 'Charges'

- Memory
- MPU
- Laser Diodes

Logical Operations on Information

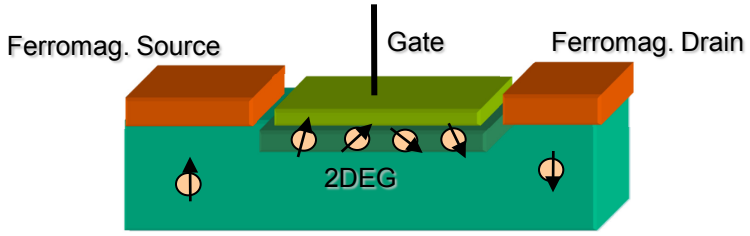
Magnetic Devices Controlling Electronic 'Spins'

- Hard Disk Drives
- MagnetoOptical Disks

Storage of Information

Integration of Semiconductor and Magnetic materials

High-Speed, Low Power Consumption



Contents:

Semiconductor devices are the basics of information technology that drives the present-day society. The current semiconductor devices function by moving or storing 'charges' of electrons. While in magnetic devices such as hard-disk drives, magnetic moments or 'spins' of electrons play an pivotal role to store information. Novel devices exploiting both electronic 'charges' and 'spins', which will be realized by integrating semiconductor and magnetic technologies, are proposed and extensively studied. This technology, referred to as spintronics, is expected to bring us beyond the present semiconductor technology and further promote the information-oriented society.

Our group has research activities in the basic properties of semiconductor and magnetic materials, and optical devices. We study the magnetic and transport properties in semiconductor-magnetic hybrid structures experimentally and by numerical calculations.

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