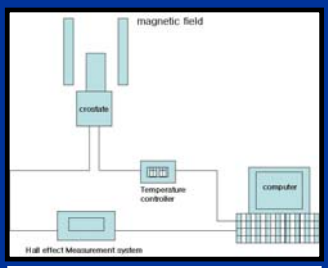
Hall Effect System

Hall Equipment

Magnetic

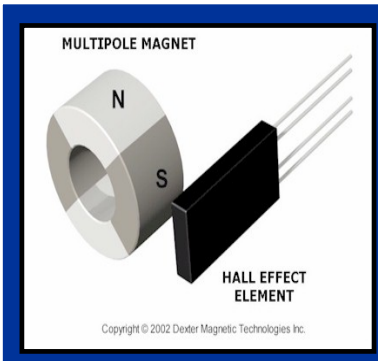
Temp. controller

Hall display



Hall schematic

Principle of Hall



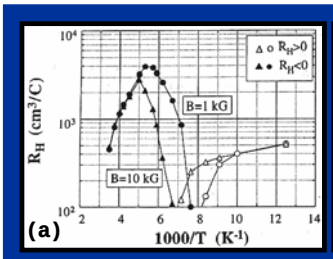
System features

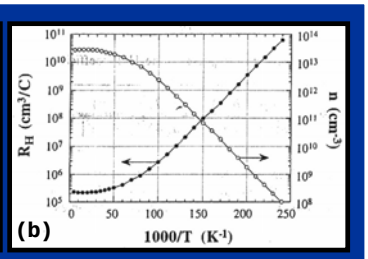
- Hall measurements is the ability to determine the carrier density, the type of the majority carriers, and the mobility with a relatively simple technique.

- A buildup of charge at the sides of the conductors will balance this magnetic influence, producing a measurable voltage between the two sides of the conductor.

- The presence of this measurable transverse voltage is called the Hall effect after E. H. Hall who discovered it in 1879.

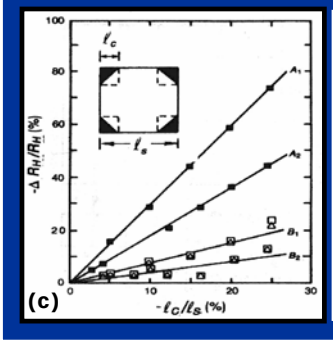
Hall Coefficient





(a) Temperature and magnetic field dependent Hall coefficient for HgCdTe showing typical mixed conduction behavior. Reprinted with permission after Zemel etal.

(b) Hall coefficient and electron density for GaAs adapted from stillman and Wolfe.



(c) Contact-size errors for the Hall effect in a Ge disk.

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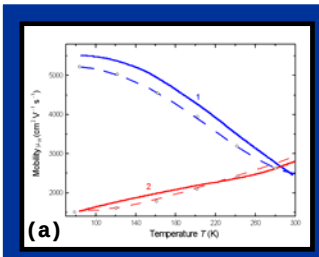
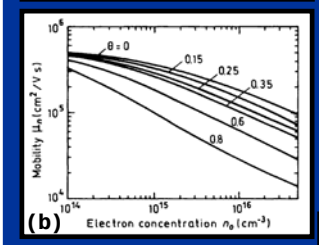
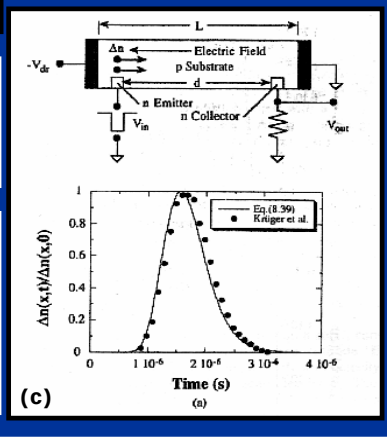
Hall & Time-of-flight drift Mobility



(a) Temperature dependence of electron Hall mobility for GaSb.
1. Nd=1.7·1018 cm-3.
2. Nd=2.8·1017 cm-3.
Broken curves represent the experimental data.
Continuous curves represent theoretical calculations.
(Mathur and Jain (1979))



(b) Electron mobility versus electron concentration



(c) Drift mobility measurement arrangement and normalized output voltage pulse.