Characterizing the Sensitivity of a Hall Sensor

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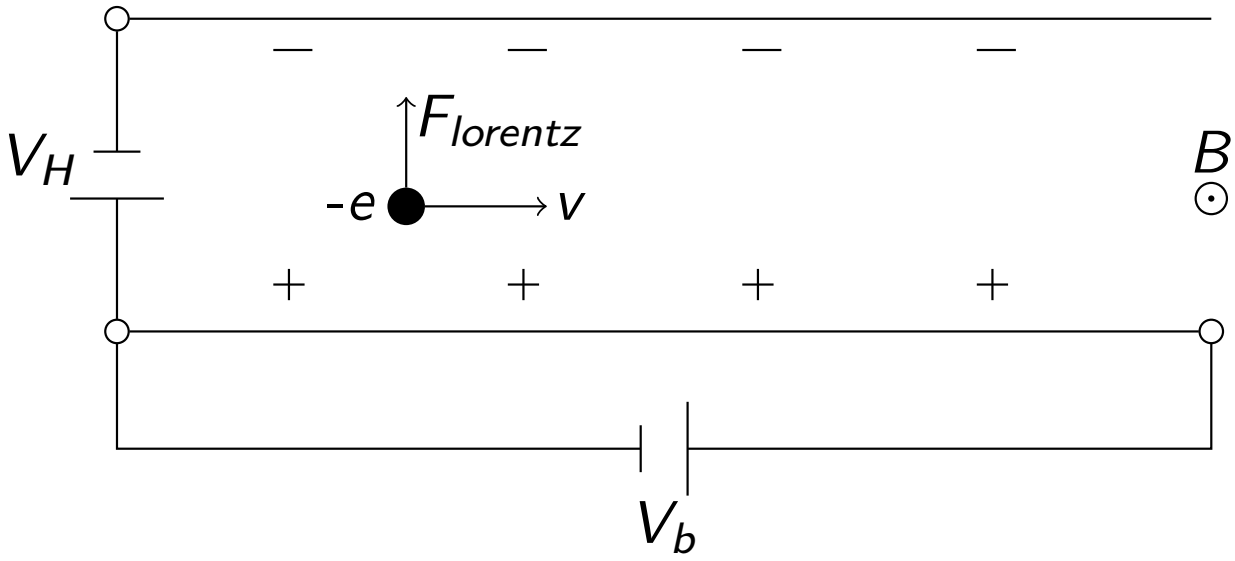
Hall Effect



- When applying a bias voltage in the presence of a magnetic field, a Hall Voltage will develop due to the Lorentz force
- Hall Voltage is proportional to a geometric factor, electron mobility, bias voltage, and magnetic field

Hall Sensors

- Hall Sensors utilize the Hall Effect to measure magnetic fields
  - Know geometric factor, electron mobility, and bias voltage
  - Hall Voltage will depend only on magnetic field
- Uses for Hall Sensors include:
  - Navigation
  - Detection of metallic objects
  - Non-destructive location of cracks in metallic objects
- Design Considerations
  - Material with large electron mobility
  - Small
  - Reduce internal magnetic fields

What I am doing

- Measuring the sensitivity of a specific Hall Sensor array made of Indium Antimonide
- Previous Results
  - In optimal conditions, each element of array has a resolution of 50 nT
- Next Step
  - Improve experimental set up (magnetic isolation and controlling thermal drift)
  - Optimize Parameters (bias voltage and electron mobility)
  - How does resolution vary with frequency of the magnetic field?