

# Ballistic Devices

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# *Ballistic Transport*

- Electron Scattering Length - Mean Free Path –  $l_e$  - Avg. distance between scattering
- Si -  $\sim 5\text{nm}$ ; GaAs -  $\sim 100\text{ nm}$
- Electrical Resistance is closely related to  $l_e$

## **Macroscopic Devices**

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## Mesoscopic Devices

- Active device length is smaller than the Scattering Length
- Electrons may travel without encountering scattering from the randomly distributed scatterers
- Electrons are scattered only at the device boundaries
- Newtonian billiard-ball model



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