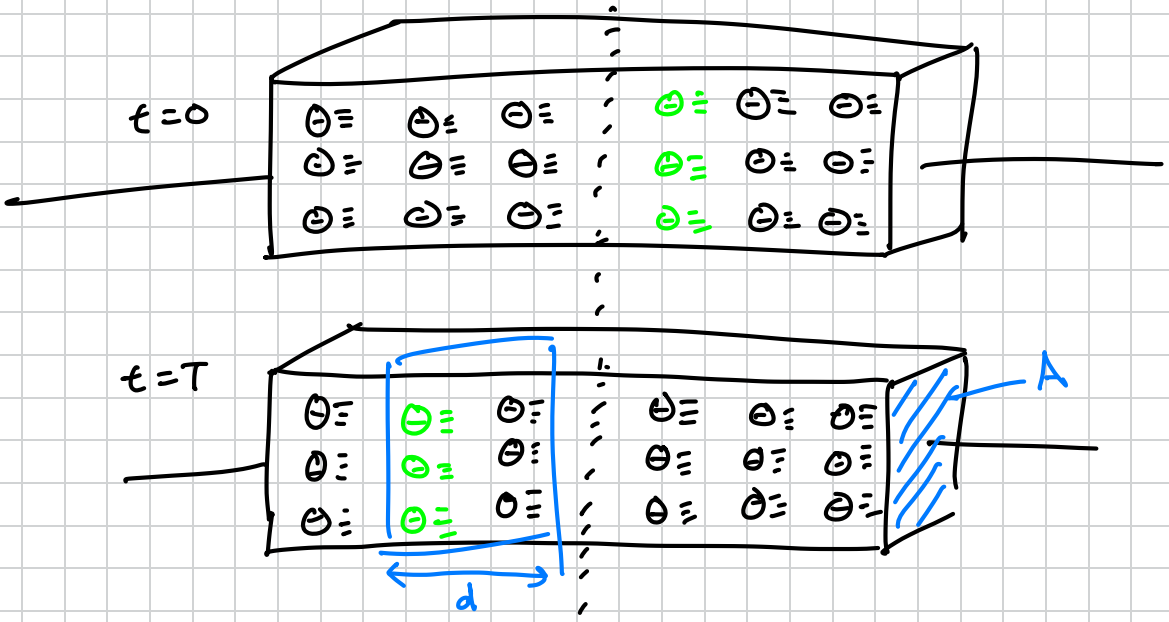


$$I = \frac{Q}{T} = \frac{q \times N}{T} = \frac{q \times n \times VOL}{T}$$

v for velocity

$$N = n \times VOL \qquad = \frac{q \times n \times dx A}{T}$$

concentration #/cm³

$$I = qnvA$$

$$\frac{I}{A} = qnv = \vec{J}(x,y,z)$$

current density

points high to low

$$-\frac{dV}{dl} = \vec{E}(x,y,z)$$

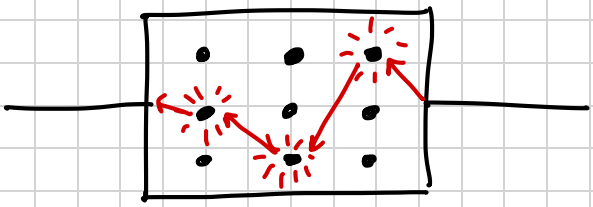
Electric field

$$V = -\int E \cdot dl$$

$$R = \frac{V}{I} = \frac{E \cdot l}{qnvA} = \frac{1}{qn\frac{v}{E}} \times \frac{l}{A}$$

intensive, extensive, mobility

v = average horizontal velocity



$$R = \frac{1}{qn\mu} \times \frac{l}{A} = \rho \frac{l}{A} \qquad \rho = \rho(x,y,z)$$

Resistivity

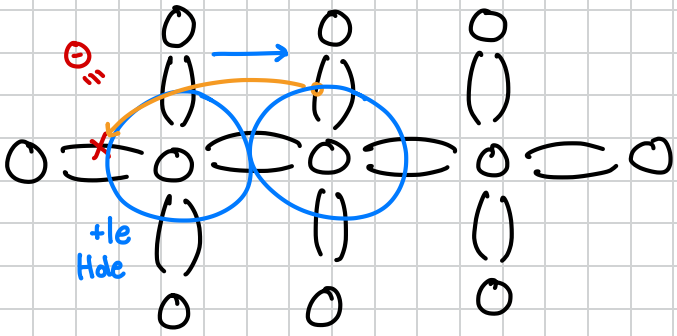
$$G = \frac{1}{R} = qn\mu \times \frac{A}{l} = \sigma \frac{A}{l}$$

Conductivity

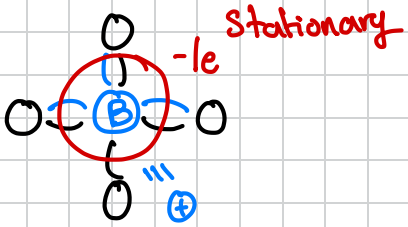
$$J = \frac{I}{A} = qnv = qn\mu E$$

$$J = \sigma E$$

$$E = \rho J$$



Electron - Hole Pair EHP



Boron - Doping

★ Holes are mobile