in last class we look Density of state $g(E) \propto \sqrt{E}$

(2) Fermi function $f(E)$

is the probility of occupation of Energy State by electron

$$f(E) = \frac{1}{1 + \exp\left(\frac{E - E_f}{K}\right)}$$

at $T \equiv 0K$ $f(E) = 1$

$E > E_f$ $f(E) = 0$

For all T

$E = E_f = \frac{1}{2}$

when energy much Higher Temperature we can approxiate

The fermi function by Boltigmann function

$$= \frac{\exp(-E - E_f)}{KT} \longrightarrow (E - E_f) \gg KT$$

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intrinsic Semiconductors

└→ Pure

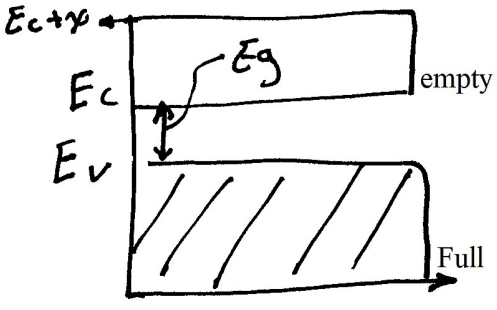
what is the intrinsic Mates(Semiconductor)

are single crystal and have no impurities or defects

Si

This used as sensors for x-Ray

Si — $3s^2$ $3p^2$ — $4sp^3$ orbitals, are hybrid



si: at 0 K $E_g = 1.17$ ev

at 300K $E_g = 1.10$ ev

χ = electron affinity = 4.05 ev