

# Bare Metal Assembly Programming

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- Input Tests

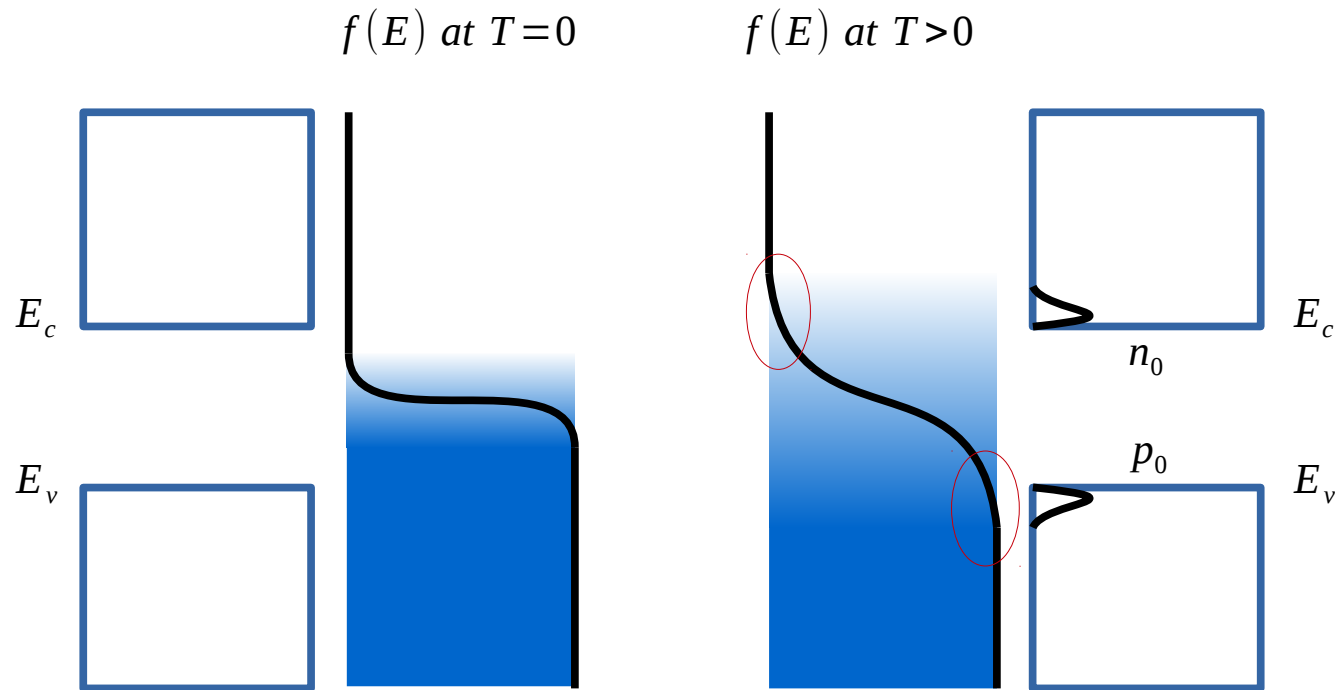
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# Fermi-Dirac Distribution Function



$$f(E) = \frac{1}{1 + e^{(E - E_c)/kT}}$$

## Fermi-Dirac distribution function

The probability that an available energy state at  $E$  will be occupied by an electron at absolute temperature  $K$

# Electron Concentration

$$n_0 = \int_{E_c}^{\infty} f(E) N(E) dE$$

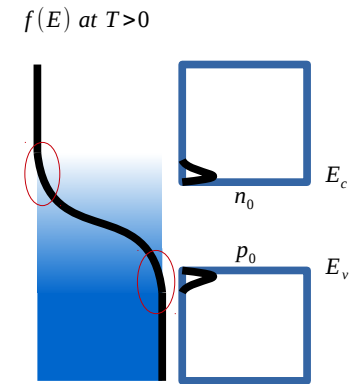
$n_0$  : the electron concentration at the equilibrium condition

$N(E) dE$  : the density of states in the energy range  $dE$

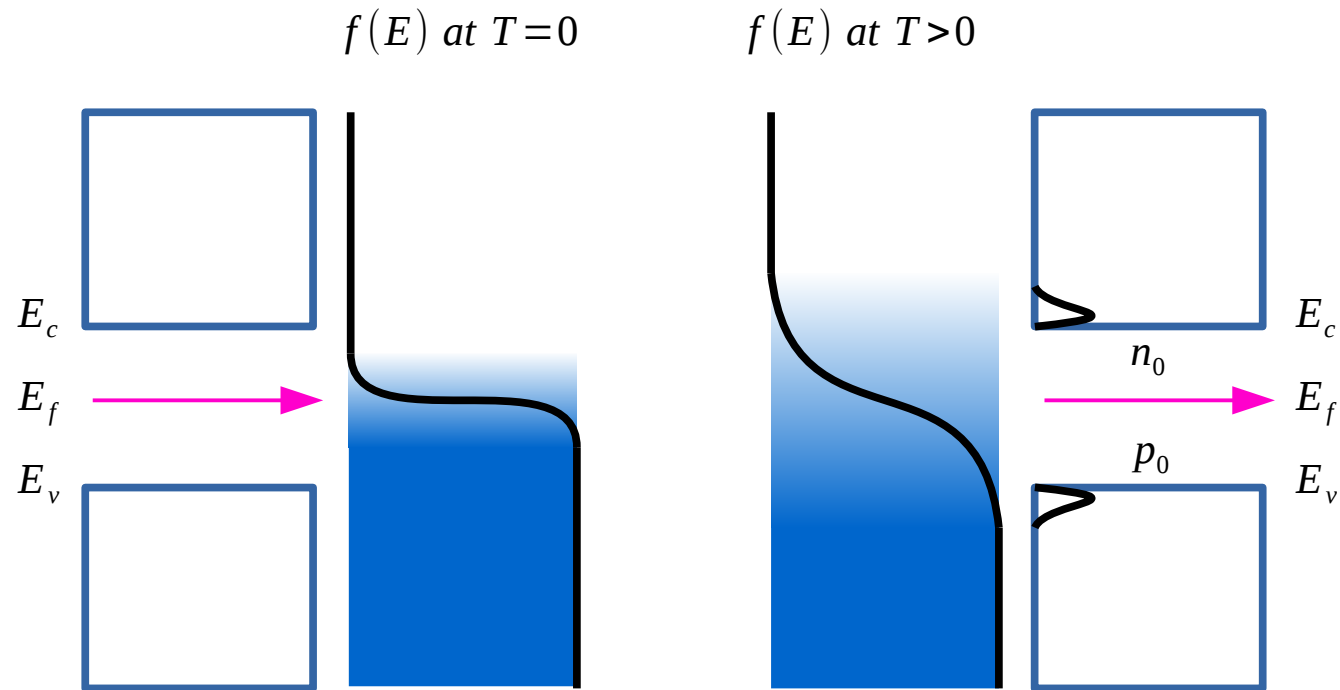
$f(E)$  : the probability of occupancy

$$f(E) = \frac{1}{1 + e^{(E - E_c)/kT}}$$

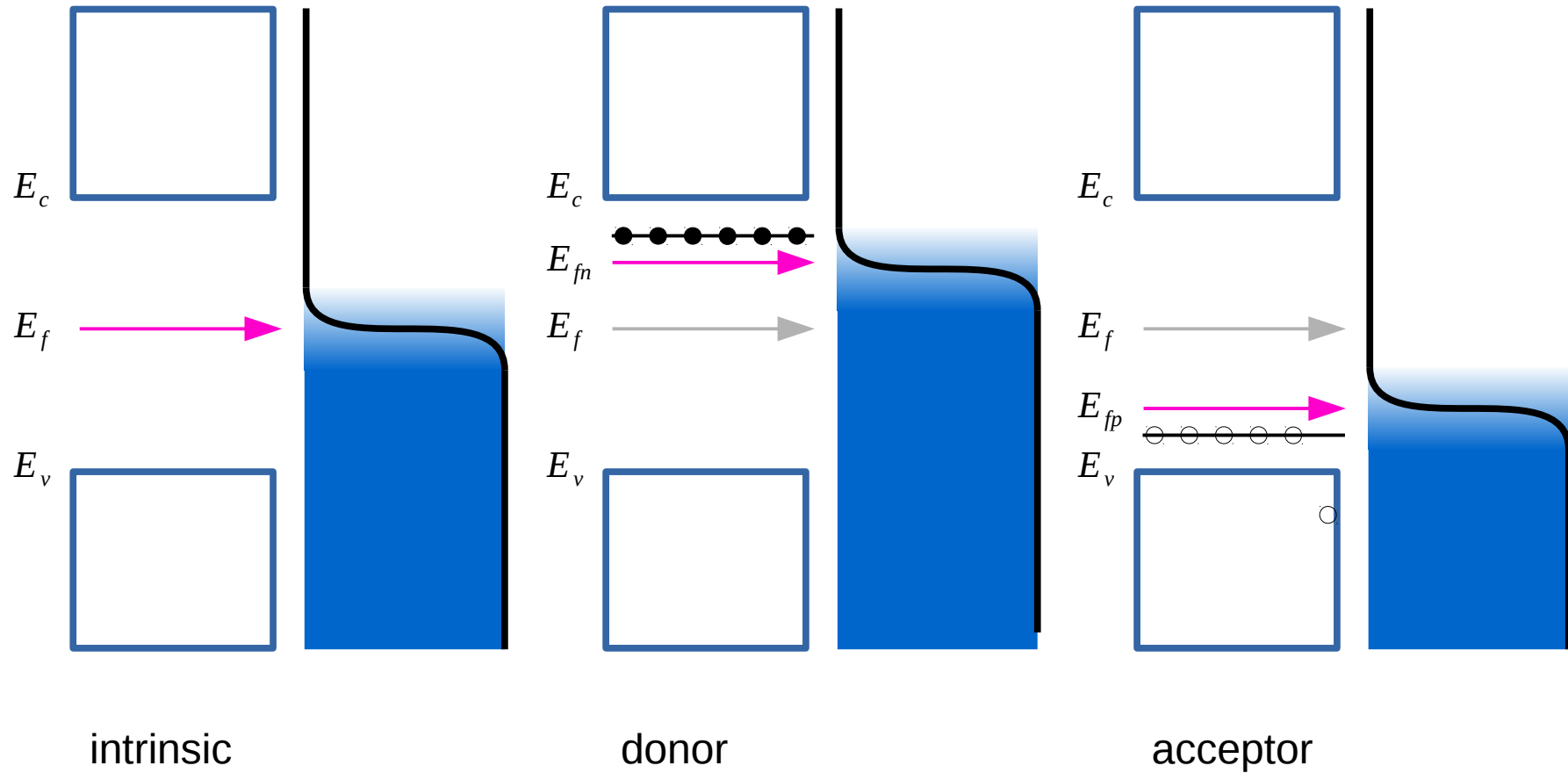
$N(E)$  : the density of electron states  
*determined from quantum mechanics  
and Pauli's exclusion principle*



# Thermal Energy

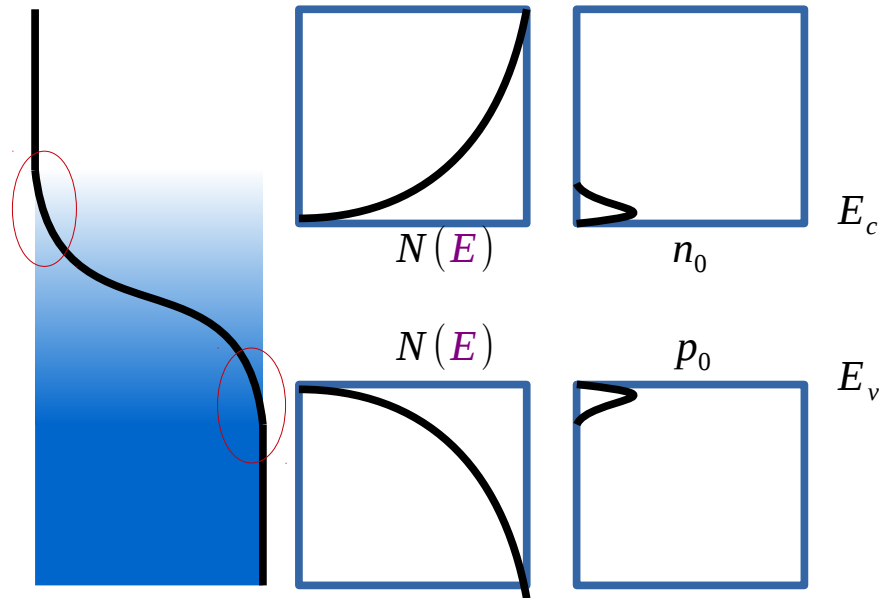


# Fermi Levels



# Electron and Hole Concentration - Intrinsic

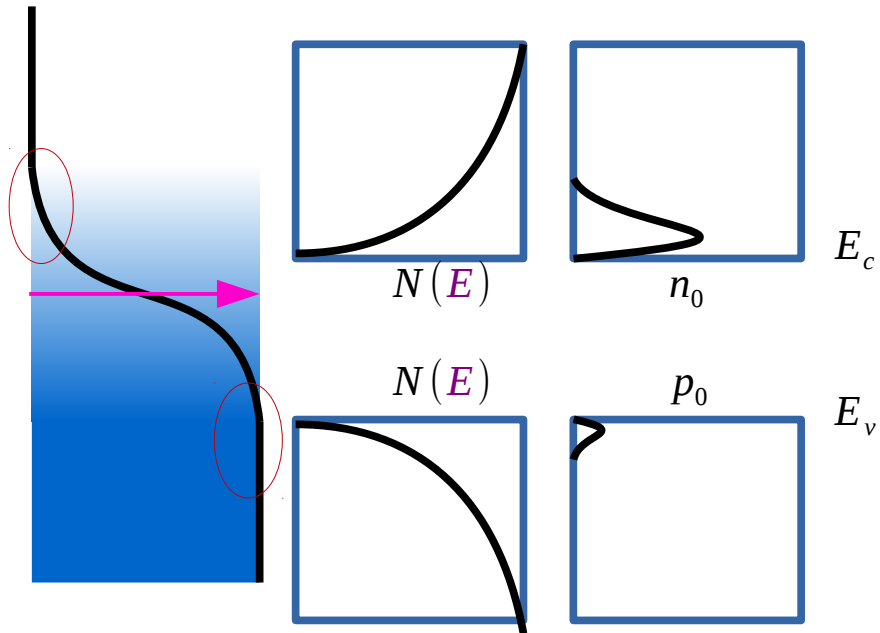
$f(E)$  at  $T > 0$



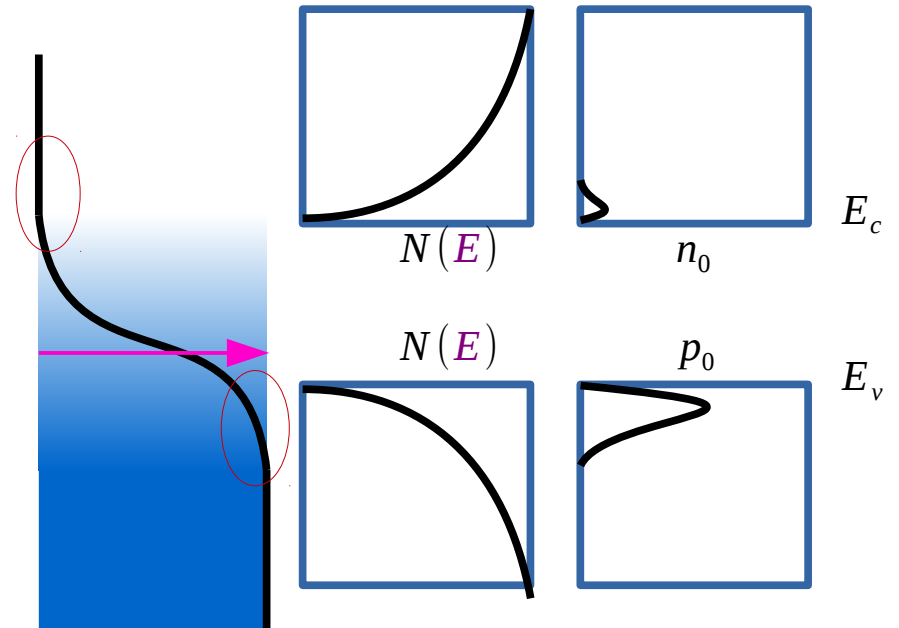
$$n_0 = \int_{E_c}^{\infty} f(E) N(E) dE$$

# Electron and Hole Concentration – Donor & Acceptor

$f(E)$  at  $T > 0$



$f(E)$  at  $T > 0$





# LED Test

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