Quantum statistics

- The collection of particles with integer and half-integer spins obey the different statistics
- Gibbs obtained the most common distribution function called Gibbs canonical distribution

$$f(E_n) = Ae^{-E_n/kT}$$

$f(E_n)$ is the probability of the state,
A is the constant

bosons and fermions

- Ideal gas of bosons is described by Bose – Einstein's distribution

$$f(E) = \frac{1}{e^{(E-\mu)/k_B T} - 1}$$

- Ideal gas of bosons is described by Fermi - Dirac's distribution

$$f(E) = \frac{1}{e^{(E-E_F)/k_B T} + 1}$$

Fermi - Dirac distribution function

- T = 0 K the distribution function

  $f(E) = 1$ if $E < \mu_0$ and

  $f(E) = 0$ if $E > \mu_0$

- At $E = E_F$, the function $f(E)$ has the value ½.