Term	Description	Formula/Equation	Relevant thermodynamic potential
Microcanonical ensemble	Fully *isolated* system	N, V, U fixed N, V, S fixed	
Canonical ensemble	*Closed* system	N, V, T fixed	$F(N, V, T)$ Helmholtz free energy
Grand canonical ensemble	*Open* system	T, μ fixed	$\Phi = F - N\mu = U - TS - N\mu = -pV$ Grand potential
Isothermal-isobaric ensemble		N, p, T fixed	G Gibbs free energy
Microstate		$\{N_{i(j)}\}$	
Macrostate		$\{N_j\}$	
Ergodic theorem	Time average equals ensemble average	$\langle N_j \rangle = \overline{N_j}$	
Classical limit		$N_j \ll g_j$	
Thermodynamic limit		$N \to \infty, \frac{V}{N} = fixed, \frac{U}{N} = fixed$ $N, V, U \to \infty$	
Boltzmann Statistics	Distinguishable particles		
Maxwell-Boltzmann Statistics	Indistinguishable particles	$N_j \ll g_j$	
Fermi-Dirac Statistics			
Bose-Einstein Statistics			
Fermions	Half odd integer spin ($s = \frac{1}{2}, \frac{3}{2}, \ldots$) Pauli exclusion principle applies	$N_{i(j)} = 0,1$	
Bosons	Integer spin ($s = 0,1,2, \ldots$) Pauli exclusion principle does not apply	$N_{i(j)} = 0,1,2, \ldots, N$	