Kinetic Theory of gases

- **Gas Laws**
  Boyles Law: PV=constant
  Charles Law : V/T=constant
- **Ideal Gas Equation**
  PV=nRT
- **Dalton Law of Partial Pressure**:
  $P=P_1 + P_2 + P_3$
  Pressure exerted by n moles of an ideal gas in terms of the speed of the molecules
  $$p = \frac{nM(v_{rms})^2}{3V}$$
- **Root mean Square Velocity**
  $$v_{rms} = \sqrt{\frac{3RT}{M}}$$
- **Mean Velocity**
  $$v_m = \sqrt{\frac{8RT}{\pi M}}$$
  K=R/N
- Average Translational energy per molecule =$\frac{3}{2KT}$
- Average kinetic Energy of Gas=$\frac{3}{2}nRT$
- **Vander Waals equation**
  $$\left(\frac{P+a}{V^2}\right)(V-b) = nRT$$
- **Maxwell's speed distribution law –**
  $$A(v) = 4\pi\left(\frac{M}{2\pi RT}\right)^{3/2} V^2 e^{-\frac{Mv^2}{2RT}}$$
  Where V is molecular speed
  M = molar mass of gas
  R = gas constant
  T = Temperature
  A (v) = Probability distribution function

A (v) dv = Fraction of the molecules whose speed lie in the interval of width dv speed center on v

- Note that $\mathbf{V_{rms} > V_m > V}$
- Most Probable Velocity

$$V = \sqrt{\frac{2RT}{M}}$$