PHYS430 - Thermal Physics

Alfaifi, Ammar

Chapter 1

Energy in Thermal Physics

1.1 Thermal Eequilibrium

- After two objects have been in contact long enough, we say that they are in **thermal equilibrium**.
- The time required for a system to come to thermal equilibrium is called the **relaxation time**.
- **Temperature** is a measure of the tendency of an object to spontaneously give up energy to its surroundings.
- The flow of energy is from the object with a higher temperature to the lower on.
- For low-density gas at constant pressure, the volume should go to *zero* at approximately $-273°\text{C}$. which defines the **absolute zero**, in the **absolute temperature scale**, in K (kelvin).

1.2 The Ideal Gas

$$PV = nRT; \qquad R = 8.31\,\text{J/mol K} \tag{1.1}$$

- A **mole** of molecules is Avogadro's number of them, 6.02×10^{23}.
- Number of molecules is $N = nn_A$
- Ideal gas law becomes $PV = NkT$, where k is Boltzmann's constant.