

Statistical Physics

March 7, 2025

- 11.10** Find the rms free path in terms of the mean free path. What is the most probable free path? Use $\ell^{-1}e^{-x/\ell}$ as the probability density function.
- 11.33** A beam of oxygen molecules start together. The pressure is 1.8×10^3 torr and the temperature is 300 K. The diameter of an oxygen molecule is approximately 3.6×10^{-10} m. How long will half the molecules remain unscattered? (Assume that all the particles have a speed equal to the mean speed.)
- 11.15** A vessel is divided into two parts of equal volume by means of a plane partition, in the middle of which is a very small hole. Initially, both parts of the vessel contain ideal gas at a temperature of 300 K and a low pressure P . The temperature of one-half of the vessel is then raised to 600 K while the temperature of the other half remains at 300 K. Determine the pressure difference in terms of P between the two parts of the vessel when steady conditions are achieved.