

Introduction To Statistical Mechanics

5. Gaussian probability Distributions

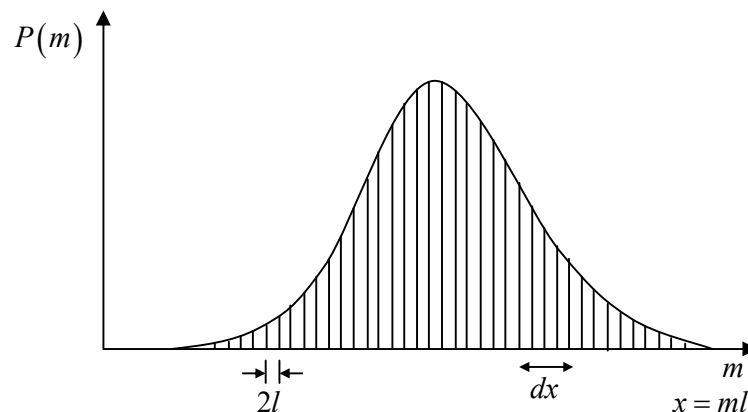


Fig. 1.6: The probability $P(m)$ of a net displacement of m unites when the total number N of steps is very large and the step length l is very small.

(a) $P(x)dx = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2} dx$, where $\mu = (p-q)Nl$ $\sigma = 2\sqrt{Npql}$

(b) $\bar{x} = \mu$

(c) $\overline{(\Delta x)^2} = \overline{(x-\mu)^2} = \sigma^2$

(d) $\overline{(\Delta x)^2} = 4Npql^2$