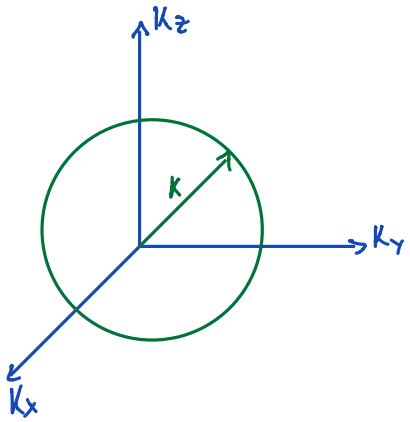
State density

$$E_j = E_{\vec{K},\sigma} = \frac{\hbar^2 K^2}{2m} = \frac{\hbar^2}{2m}\left(K_x^2 + K_y^2 + K_z^2\right)$$

$$K = \sqrt{\frac{2mE}{\hbar}}$$



$\# :=$ Number of states within the sphere

$$\# = \frac{\frac{4}{3}\pi K^3}{\left(\frac{2\pi}{L}\right)^3} = \frac{1}{6\pi^2} V K^3$$

$$D(E) = \frac{d\#}{dE} = \frac{d\#}{dK}\frac{dK}{dE} = \frac{1}{6\pi^2} V 3K^2 \sqrt{\frac{2m}{K^2}}\,\frac{1}{2} E^{-1/2}$$

$$= \frac{1}{4\pi^2} V \frac{2mE}{\hbar^2}\sqrt{\frac{2m}{\hbar^2}} E^{-1/2} = \frac{1}{4\pi^2} V \left(\frac{2m}{\hbar^2}\right)^{3/2} E^{1/2}$$