

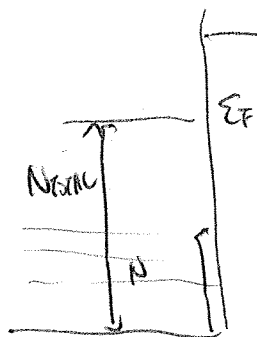
$$\lambda_{ux} = \frac{2L}{u_x} \quad P_{ux} = \frac{u}{\lambda_{ux}} = \frac{u u_x}{2L}$$

$$\Sigma = \frac{|P_{ul}|^2}{2m} = \frac{u^2}{8mL^2} (u_x^2 + u_y^2 + u_z^2)$$

$$u = \sqrt{u_x^2 + u_y^2 + u_z^2}$$

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$$N = 2 \times \frac{1}{8} \times \frac{4\pi}{3} u^3$$

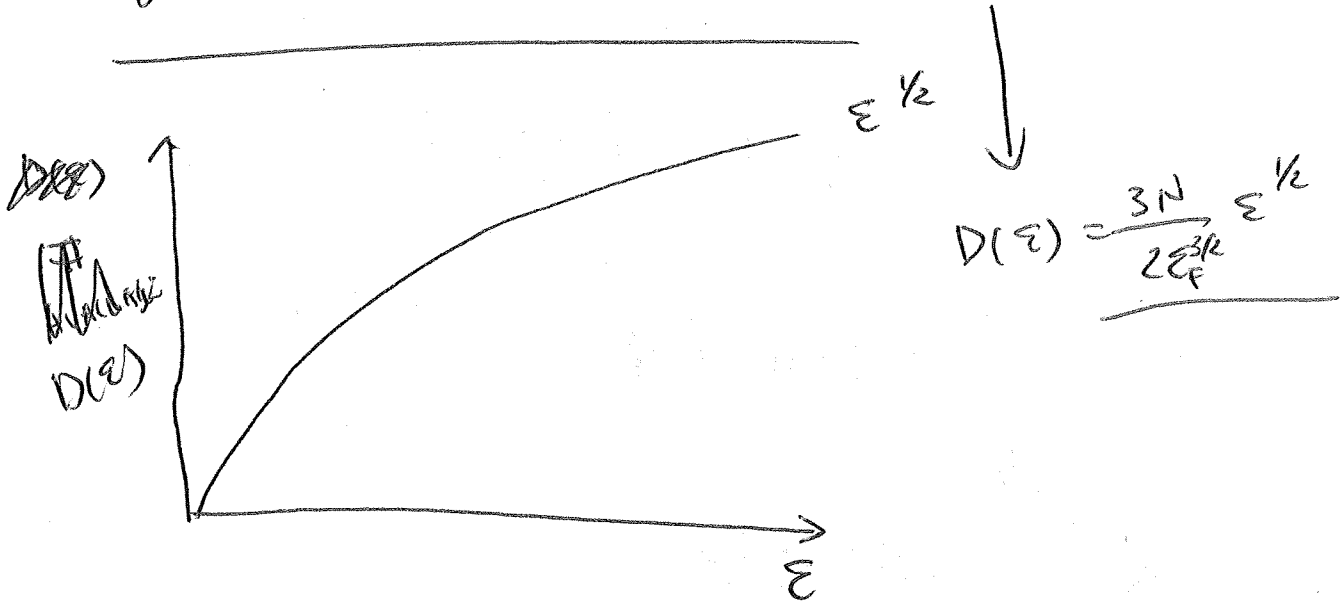
$$\frac{\partial \Sigma}{\partial \epsilon} = \frac{u^2}{8mL^2} \left( \frac{3N}{\pi V} \right)^{2/3} \rightarrow$$

N: # OF ELECTRONS  
V: VOLUME OF SOLID

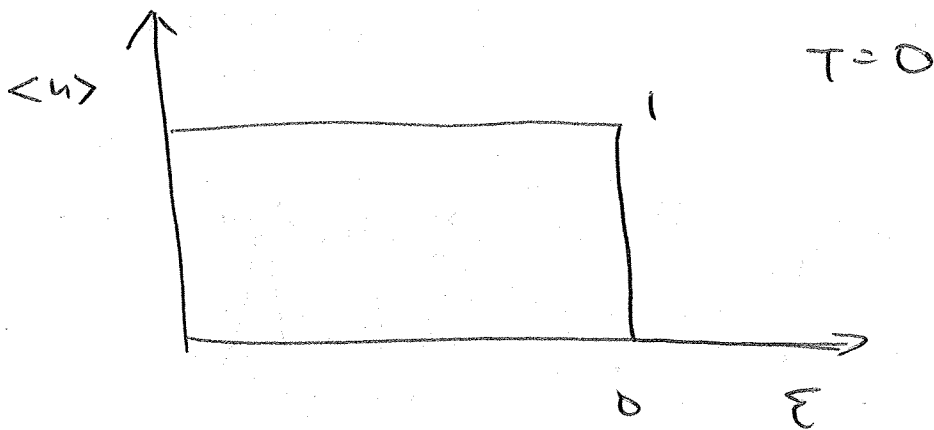
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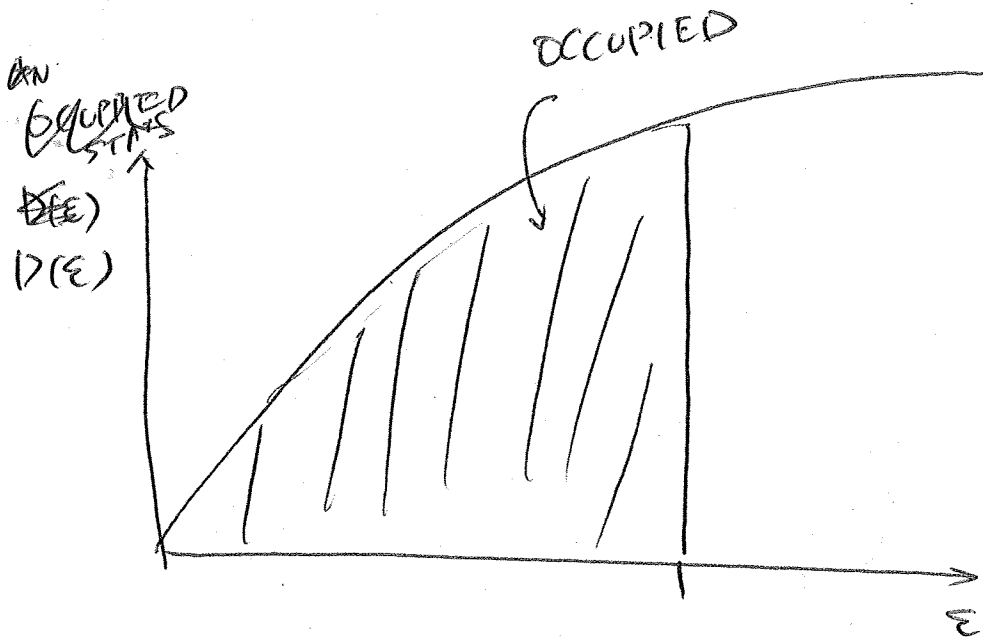
$$\frac{\pi V}{3} \left( \frac{8mL^2}{h^2} \right)^{3/2} = N \quad \frac{\partial N}{\partial \epsilon} = \left( \frac{\pi V}{3} \right) \left( \frac{8m}{h^2} \right)^{3/2} \frac{3}{2} \epsilon^{1/2}$$

$$\frac{\partial N}{\partial \epsilon} = \frac{\pi V}{2} \left( \frac{8m}{h^2} \right)^{3/2} \epsilon^{1/2} = \text{# OF AVAILABLE STATES AT ENERGY } \epsilon$$



BUT  $\langle n \rangle = \frac{1}{e^{(\epsilon - \mu)/kT} + 1}$





$$N_{\text{TOTAL}} = \int_0^{\infty} D(E) f(E) dE$$

AT T=0

$$= \int_0^{\epsilon_F} D(E) dE = \int_0^{\epsilon_F} \frac{\pi V}{2} \left( \frac{8m}{h^2} \right)^{3/2} \epsilon^{1/2} d\epsilon$$

$$N_{\text{TOTAL}} = \frac{2}{3} \left( \frac{\pi V}{2} \right) \left( \frac{8m}{h^2} \right)^{3/2} \epsilon_F^{3/2}$$

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