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$$\begin{aligned} \text{Totalenergien } U &= \iiint E(n) d\epsilon d\Omega d\eta \\ &= 2 \int_{-\infty}^{\infty} E(n) n^2 d\epsilon \int_{0}^{\pi/2} \int_{0}^{2\pi} \sin\theta d\theta d\phi \\ \text{Samspillet } g(\epsilon) &\rightarrow U = \int \epsilon g(\epsilon) d\epsilon \rightarrow \bar{E} \\ \text{g}(\epsilon) \text{ fordelingsfunksjon, tilhørighet} &\\ \frac{\pi n^2 E(n) d\epsilon}{\bar{E}} &\rightarrow \frac{E g(\epsilon) d\epsilon}{\bar{E}} \\ E = \frac{\hbar^2 \pi^2}{8m L^2} &\Rightarrow n = \sqrt{\frac{3\pi^2}{8\hbar^2} \frac{1}{2\pi R}} \\ dn &= \sqrt{\frac{3\pi^2}{8\hbar^2} \frac{1}{2\pi R}} d\epsilon \\ \frac{\pi}{\hbar^2} \frac{3m^2}{4} \epsilon \cdot \epsilon &\sqrt{\frac{3\pi^2}{8\hbar^2} \frac{1}{2\pi R}} = \epsilon g(\epsilon) \\ \Rightarrow g(\epsilon) &= \frac{\pi \hbar^2 \pi^2}{8\hbar^2} \frac{3}{2} \frac{1}{\epsilon^2} = \frac{\pi^2}{2} \frac{1}{\epsilon^2} \quad \text{Tilhørighet} \\ P &= \left(\frac{\partial U}{\partial V} \right)_{T,N} = \frac{2N E_F}{5V} = \frac{2}{3} \frac{U}{V} \end{aligned}$$

Vedligeholdtig! Fra delningsprinsippet. Høyt degradertspunkt

Degenerat gass	Molekylar	Det høye trykket
Elektronengass	Metall	Balansever elektronisk tilhørighet
Polarelektrisk elektronengass	Husk deres	Balansever gravitasjon
Kaptongas	Negativt	

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Kobber $\rho = 9 \text{ g/cm}^3$ $d_i = 63.5 \text{ g/mol}$

En kobberbit på 63.5 g 1 mol atomer $N = N_A$

$$V = \frac{63.5 \text{ g}}{9 \text{ g/cm}^3} = 7 \cdot 10^{-6} \text{ m}^3$$

Antall atomer atom per cm³ $n_e = N_A$

$$N = \frac{6 \cdot 10^{23}}{7 \cdot 10^{-6} \text{ m}^3} = 9.5 \cdot 10^{28} \text{ m}^{-3} \sim 1 \text{ Å}^3$$

$$E_F = \frac{\hbar^2}{8m} \left(\frac{3N}{\pi V} \right)^{2/3} = 10^{18} \text{ J} = 7 \text{ eV}$$

$$T_F = \frac{E_F}{k} = 82000 \text{ K}$$

$$\hat{P} = \frac{E}{5} \frac{N}{V} E_F = 3.8 \cdot 10^{10} \text{ Pa} \sim 40 \text{ GPa} \sim 4 \cdot 10^5 \text{ atm}$$

$$B = -V \left(\frac{\partial P}{\partial V} \right)_T = 64 \text{ GPa} \quad \text{Eksp. verd.: } B = 123 \text{ GPa}$$

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Varmeholdskraft? $T > 0$ $C_v = \left(\frac{\partial U}{\partial T} \right)_{N,V}$

Denne delen er skjult \rightarrow enkelhet elektron skjult $\propto kT$
 $\propto N$

Elektron energi utgangspunkt \propto antall elektroner $\propto N E_F$
 \propto antall elektroner $\propto kT$
 \propto antall elektroner $\propto N (kT)$

$\frac{\Delta U}{E_F}$ Energipart $\frac{E_F}{E_F} = 1$ \rightarrow like delinger

$$U(T > 0) = U(T=0) + \frac{\Delta U}{E_F} \frac{N(E_F)}{E_F}$$

$$C_v = \left(\frac{\partial U}{\partial T} \right)_{N,V} \propto \frac{N k T}{E_F}$$

$T > 0$ lett over formatt

$T=0$ fordelingsfunksjon $f(\epsilon) = g(\epsilon) \tilde{n}_{\text{tot}}(\epsilon)$
 $T > 0$ $f(\epsilon) = g(\epsilon) \tilde{n}_{\text{tot}}(\epsilon)$

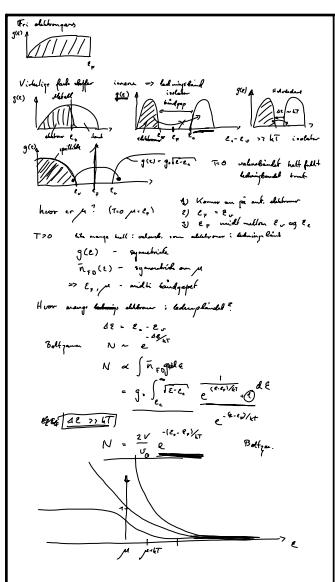
$$N = \int g(\epsilon) \tilde{n}_{\text{tot}}(\epsilon) d\epsilon$$

$$\Rightarrow \frac{N}{E_F} = 1 - \frac{\pi^2}{12} \left(\frac{kT}{E_F} \right)^2$$

$$U = \int \epsilon f(\epsilon) d\epsilon = \int \epsilon g(\epsilon) \tilde{n}_{\text{tot}}(\epsilon) d\epsilon \rightarrow$$

$$= \frac{3}{5} N E_F + \left(\frac{\pi^2}{12} \right) N \left(\frac{kT}{E_F} \right)^2 + \dots$$

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