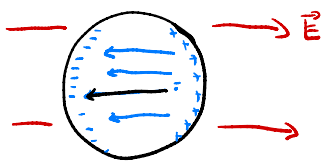
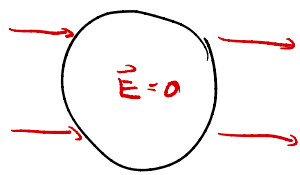
Ideelle leder

Leder: metall → sky av frie elektroner

Konsekvensen av at vi har - en sky av ladninger



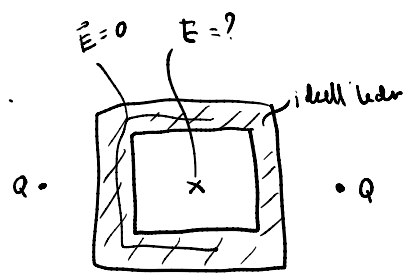


Egenskaper til en ideell leder

(i) $\vec{E} = 0$ inne i lederen

(ii) V er konstant i en leder

Ekvipotensial-flater



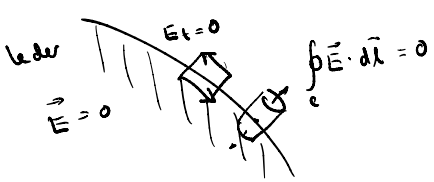
(iii) $E_t = 0$ umiddelbart utenfor

(iv) $E_n = \rho_s / \epsilon_0$

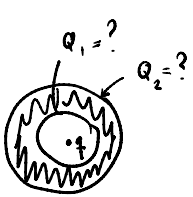
$D_1 - \overset{0}{\cancel{D_2}} = \rho_s$

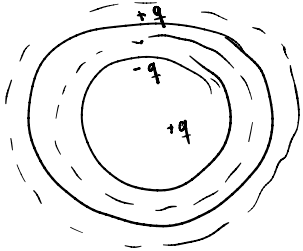
$\epsilon_0 E_1 = \rho_s$

$E_1 = \rho_s / \epsilon_0$



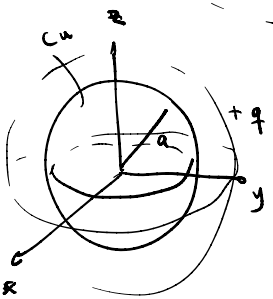
TEST





TEST

$\vec{E}(\vec{r})$

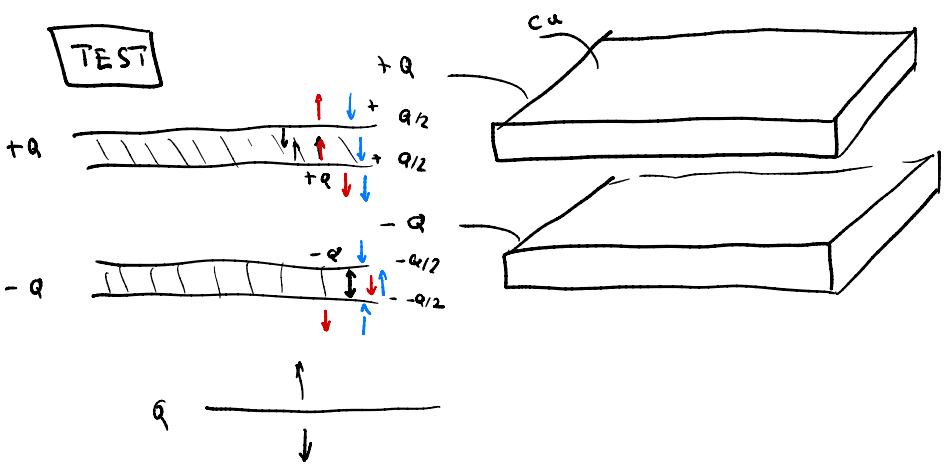


$\oint \vec{E} \cdot d\vec{S} = q/\epsilon_0$

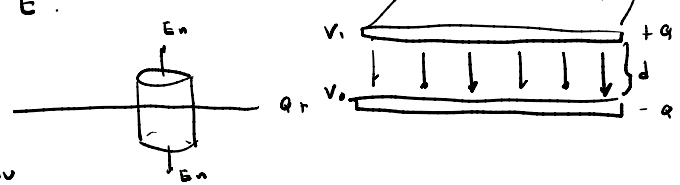
$E_r \cdot 4\pi r^2 = q/\epsilon_0$

$$E_r = \begin{cases} \frac{q}{4\pi\epsilon_0} \frac{1}{r^2} & r > a \\ 0 & r < a \end{cases}$$

TEST



Hva blir E?



Gauss lov

$$\oint_S \vec{E} \cdot d\vec{S} = E_n S + E_n S = 2 S E_n = \frac{\rho_s S}{\epsilon_0}$$

$$E_n = \frac{\rho_s}{2\epsilon_0} = \frac{Q/A}{2\epsilon_0} = \frac{Q}{2\epsilon_0 A}$$

Finn V

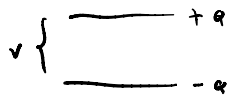
$$V_1 - V_0 = V = \int \vec{E} \cdot d\vec{l} = E \cdot d = 2 \cdot \frac{Q}{2\epsilon_0 A} \cdot d$$

(to plater!)

$$V = \frac{Qd}{\epsilon_0 A}$$

$$\frac{Q}{V} = \frac{A\epsilon_0}{d} = C$$

kapasitans.



$$Q = C \cdot V$$

Kapasitans $C = \frac{Q}{V}$ geometrisk egenskap

For å finne C:

(A)

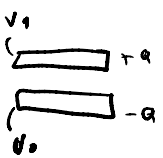
(i) Anta ladninger $+Q, -Q$ plassert på lederne

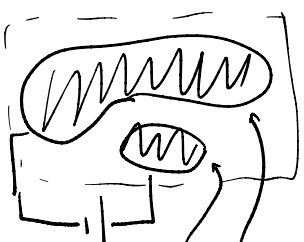
(ii) Finn $\vec{E}$

(iii) Finn V ;

(iv) Finn $\Delta V = V_1 - V_0$

(v) Finn $C = Q/V$





(B)

(i) Anta V_0, V_1

(ii) Finn $V(\vec{r})$ fra $\nabla^2 V = 0$

(iii) Finn $\vec{E}(\vec{r})$ fra $-\nabla V$

(iv) Finn $\rho = \epsilon_0 \vec{E} \cdot \hat{n}$

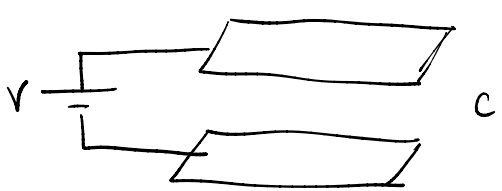
(v) Finn $Q = \int \rho \, dS$

(vi) Finn $C = Q/V$

TEST

a) $V \longrightarrow 2V$

Hva skjer med C?



(1) $C = \frac{Q}{V}$

b) Hva skjer med ladningene? $Q = CV$