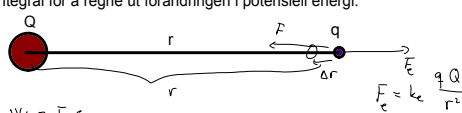


Arbeid og energi i et elektrisk sentralfelt

Hvis vi flytter q, gjør vi et arbeid. Kraften vi bruker varierer med avstanden. Vi må derfor bruke arbeid som integral for å regne ut forandringen i potensiell energi.

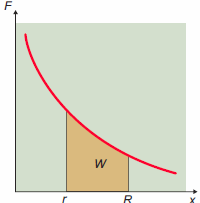


$F_e = k_e \frac{qQ}{r^2}$


$W = F \cdot s$

$\Delta W = F(r) \cdot \Delta r$

$W = - \int_{\infty}^r F_e(r) dr = \int_{\infty}^r k_e \frac{qQ}{r^2} dr = k_e qQ \int_{\infty}^r \frac{1}{r^2} dr = k_e qQ \left[-\frac{1}{r} \right]_{\infty}^r = k_e \frac{qQ}{r} = E_p$



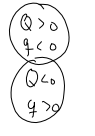
$Q > 0$
 $q > 0$



$E_p = k_e \frac{e^2}{r}$
 $E_k = 0$

$r = 5,21 \cdot 10^{-10} \text{ m}$

$Q < 0$
 $q > 0$



$E_p \approx 0$
 $E_k = 2 \frac{1}{2} m v^2$

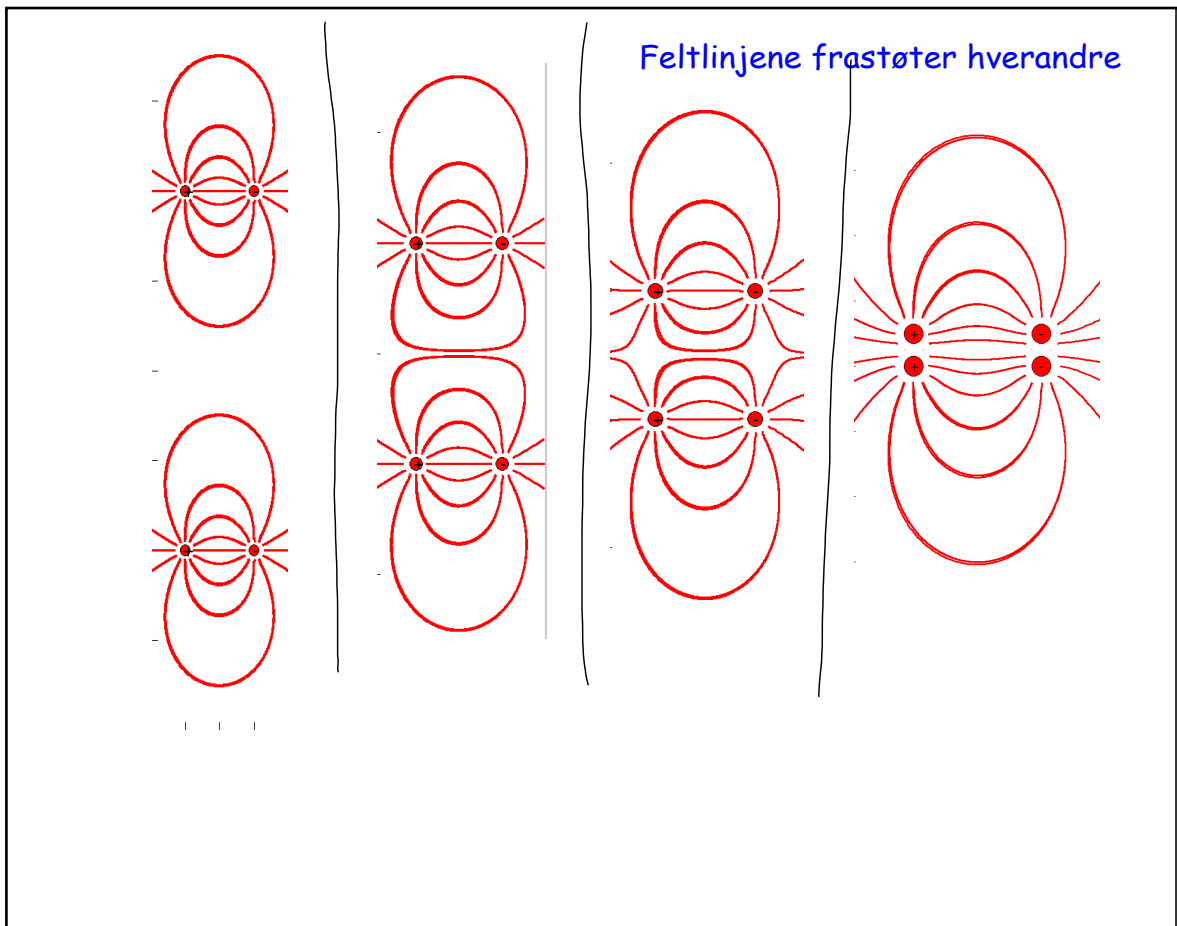
$k_e \frac{e^2}{r} = m v^2$ $v = \sqrt{\frac{k_e e^2}{m r}} = 2,18 \cdot 10^{-6} \text{ m/s}$

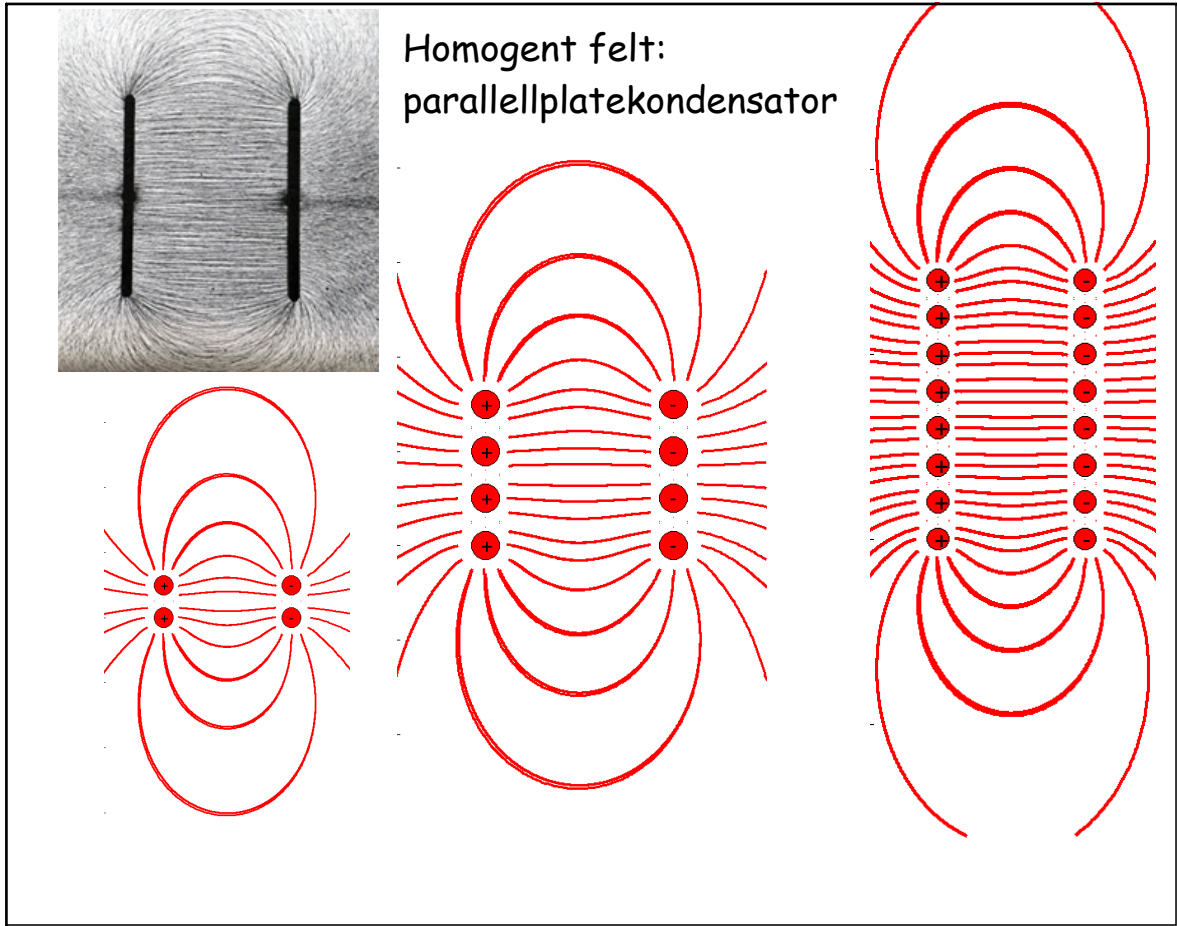
b)

$E_p = -k_e \frac{e^2}{r} = -4,35 \cdot 10^{-18} \text{ J}$

$r = 5,21 \cdot 10^{-10} \text{ m}$ $E_k = -2,18 \cdot 10^{-18} \text{ J}$

mai 10-09:52





Elektrisk feltstyrke

Elektrisk felt mellom to parallelle metallplater.
Feltet er homogent (like sterkt overalt).

$$U = \frac{W}{q} = E \cdot d$$

$$W = F_e \cdot d = q \cdot E \cdot d$$

Feltstyrke i homogent elektrisk felt: $E = \frac{U}{d}$

mai 5-13:02

$U = Ed = 8,0 \cdot 10^3 \text{ V/m} \cdot 3,0 \cdot 10^3 \text{ m}$
 $= 24 \cdot 10^6 \text{ V} = 24 \cdot 10^7 \text{ V}$

$U = 70 \text{ mV}$
 $E = \frac{U}{d} = \frac{70 \text{ mV}}{7 \cdot 10^{-9} \text{ m}} = 10^7 \text{ V/m}$

$7 \text{ nm} = 7 \cdot 10^{-9} \text{ m}$

mai 3-14:03

Kondensator i elektrisk krets

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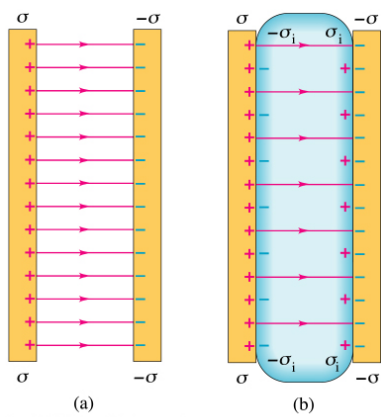
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Kapasitans



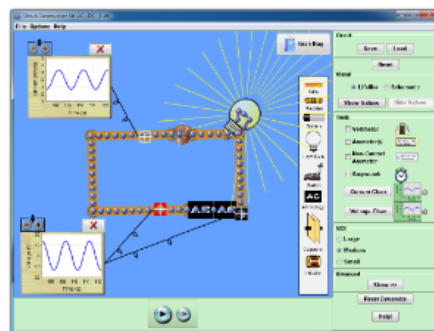
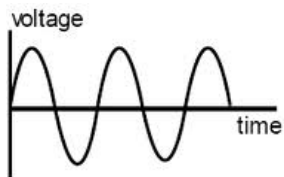
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Relativ permittivitet for noen stoffer

Stoff	ϵ_r
Vakuum	1 (eksakt)
Luft, ved 101 kPa	1,00059
Papir	3,0
Teflon	2,1
Pleksiglass	3,4
Glass	5-10
Cellemembran	9,0
Vann	80

May 6-10:34 AM

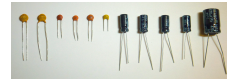
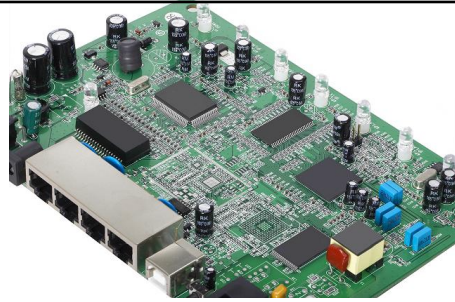
Vekselstrøm



<http://phet.colorado.edu/en/simulation/circuit-construction-kit-ac>

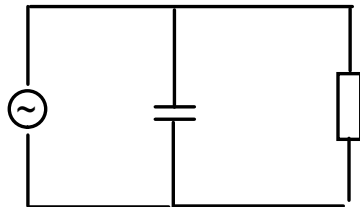


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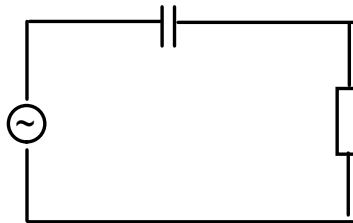


Kondensatorer er viktige komponenter i elektronikk

Eksempel: Kondensator som frekvensfilter

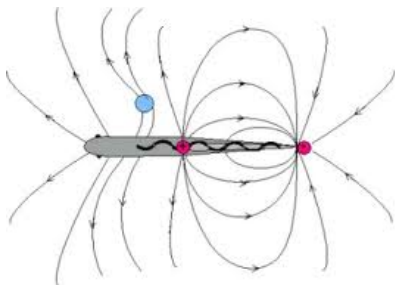


Kondensator og motstand i parallell gir lavpassfilter

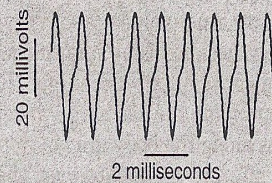


Kondensator og motstand i serie gir høypassfilter

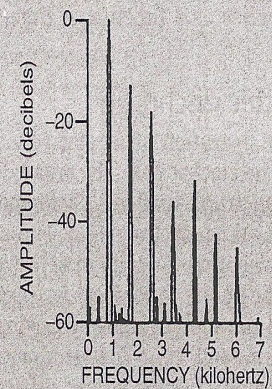
May 6-11:20 AM



c Aptereronotus leptorhynchus ('wave' fish)



d



mai 3-13:54

