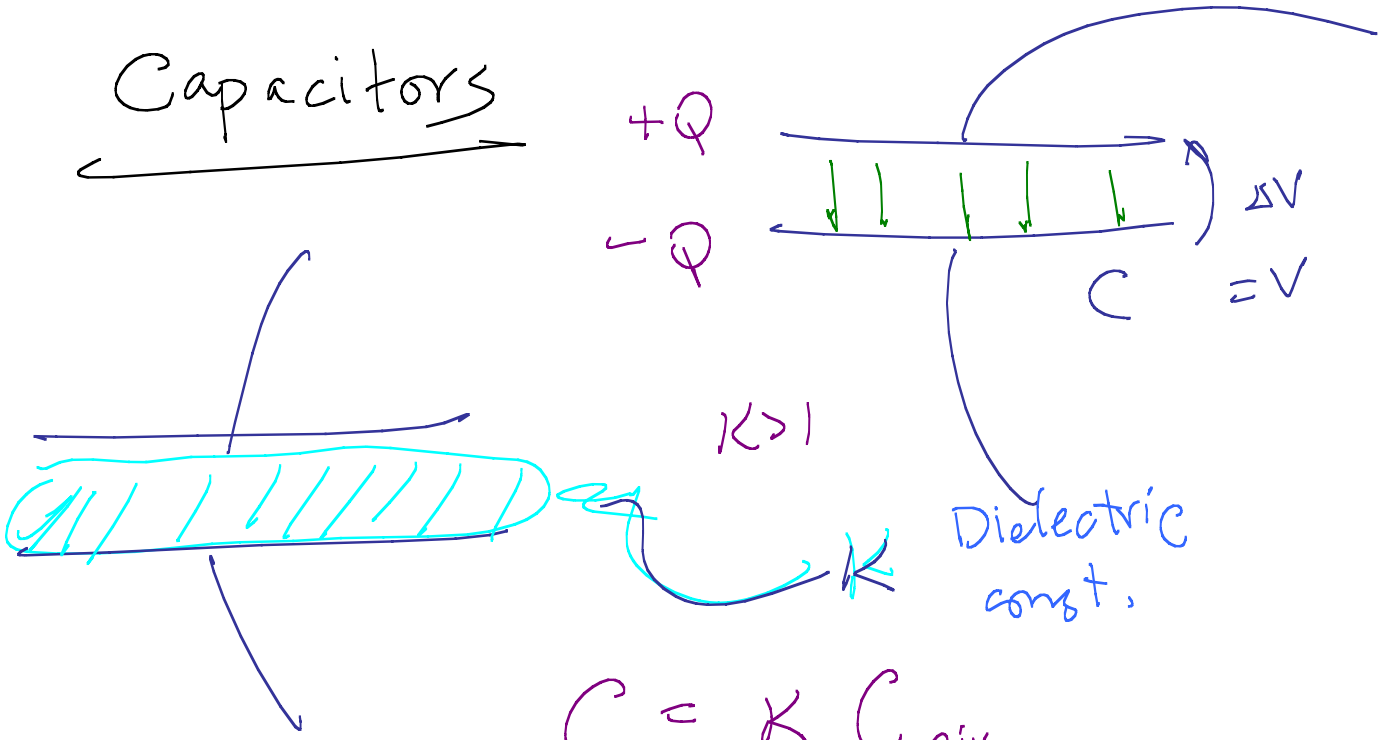
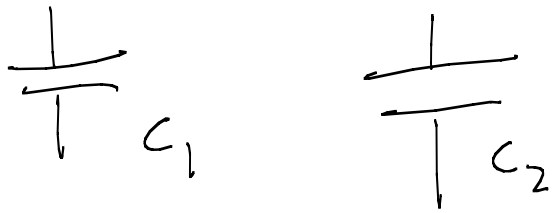
Phys 2120-4 9/19/12

Note Title 9/19/2012

Capacitors



Connecting Capacitors



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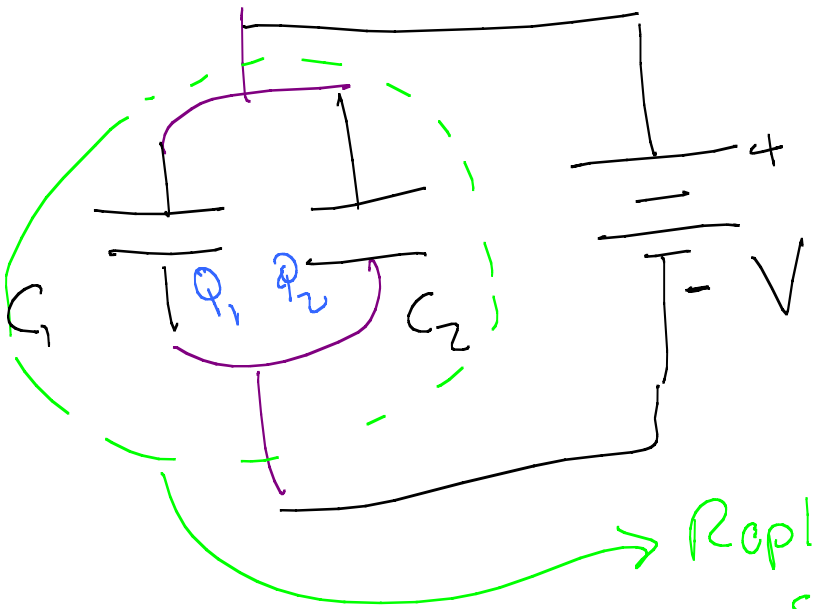
Connect in parallel



Charge Q_1 collects on C_1

Charge Q_2 on C_2

Potential V across C_1 or C_2

$Q_1 = C_1 V$ $\quad Q_2 = C_2 V$

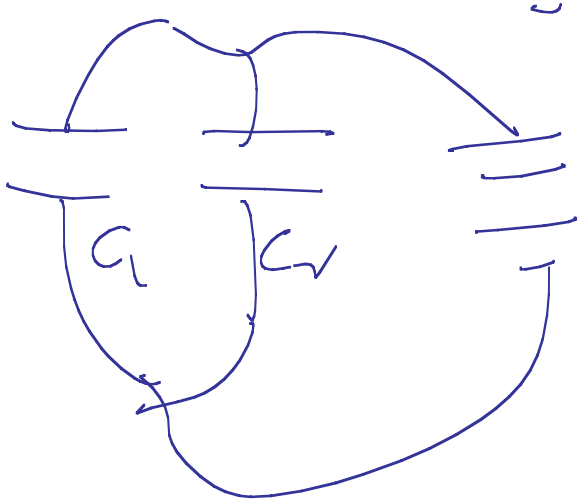
Add $\quad Q_1 + Q_2 = C_1 V + C_2 V$

$= (C_1 + C_2) V$

→ Replace by single capacitor

$$Q_1 + Q_2 = (C_1 + C_2)V$$

$$= C_{eq} V = Q_{total}$$



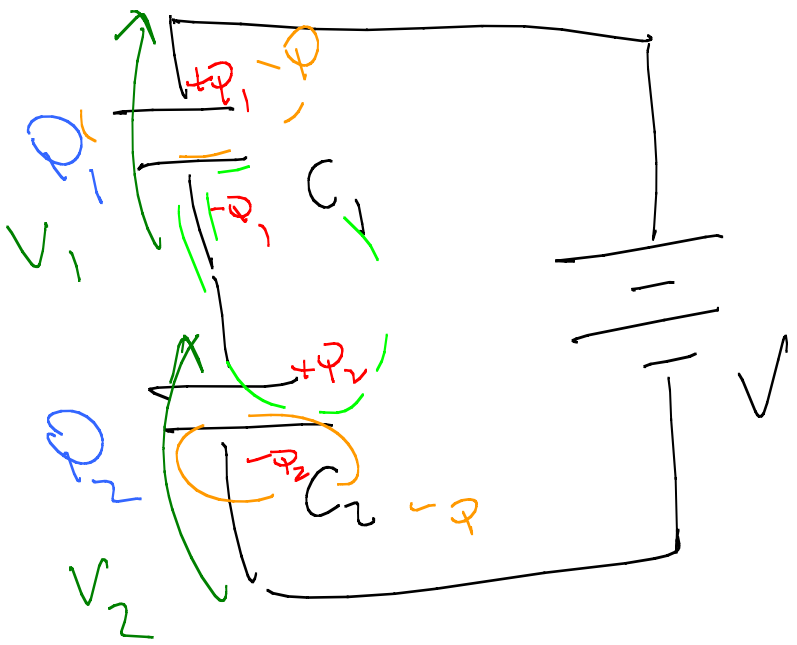
$$C_{equivalent} = C_1 + C_2$$

For caps in parallel,

$$C_{eq} = C_1 + C_2$$

$$C_{eq} = C_1 + C_2 + C_3 + \cdots$$

Series combination of cap's.



$Q_1 = C_1 V_1$

$V_1 + V_2 = V$

$\frac{Q_1}{C_1} + \frac{Q_2}{C_2} = V$

$Q_1 = Q_2 = Q$

$Q\left(\frac{1}{C_1} + \frac{1}{C_2}\right) = V$