## **Electric Charge**

q = electric charge, that which creates electric force of attraction or repulsion Unit = 1 coulomb or 1  $\mbox{C}$ 

$$|\vec{F}_{\text{electric}}| = \frac{k|q_1\|q_2|}{r^2}$$

 $\vec{F}_{\rm electric}$  is conservative

## **Electric Fields**

Units: N/C

$$\vec{E} = \frac{kq}{r^2} = \frac{F}{q}$$

Uniform  $\vec{E}$  fields:

- All lines parallel
- $|\vec{E}|$  is same everywhere

## Line Charge

$$\lambda = \text{linear charge density } \lambda = \frac{q}{L} = \frac{dq}{dL}$$

Horizontal Line Charge:

$$\begin{split} E_x &= 0 \\ E_y &= \frac{k\lambda L}{y\sqrt{\frac{L^2}{4} + y^2}} = \frac{kq}{y\sqrt{\frac{L^2}{4} + y^2}} \end{split}$$