

Charged Particle Moving in Uniform Electric Field



- Electric field \vec{E} is directed up.
- Electric force: $\vec{F} = q\vec{E}$ (constant)
- Acceleration: $\vec{a} = \frac{\vec{F}}{m} = \frac{q}{m}\vec{E} = \text{const.}$
- Horizontal motion: $a_x = 0 \Rightarrow v_x(t) = v_0 \Rightarrow x(t) = v_0 t$
- Vertical motion: $a_y = \frac{q}{m}E \Rightarrow v_y(t) = a_y t \Rightarrow y(t) = \frac{1}{2}a_y t^2$
- The path is parabolic: $y = \left(\frac{qE}{2mv_0^2}\right) x^2$
- \vec{F} changes direction and magnitude of \vec{v} .

