Potential Energy

Point Charge
$$U = \frac{kqQ}{r}$$

V = electric potential

$$V = \frac{U}{q}$$

$$\Delta V = \frac{\Delta U}{q}$$

$$\Delta V = -\int ec{E} \cdot dec{r}$$

Electron Volt

electron-volt : amount of kinetic energy gained by an electron when it accelerates through one volt of potential

$$\Delta KE = -\Delta U = -(q\Delta V) = -(-e)(1 \text{ V})$$

1 electron-volt = 1 eV = 1.602×10^{-19} J

$$\Delta V = \frac{-\lambda}{2\pi\varepsilon_0} \ln\!\left(\frac{r_f}{r_0}\right)$$

Equipotential Curves + Surfaces

- an equipotential is any curve or surface along which $\Delta V=0$
- example: perpendicular to uniform \vec{E}

$$|\vec{E}| = \frac{-\Delta V}{\Delta r} = \frac{-dV}{dr}$$

$$\vec{E} = \frac{-dV}{dx}\hat{i} - \frac{dV}{dy}\hat{j}$$