

# Energy in E field

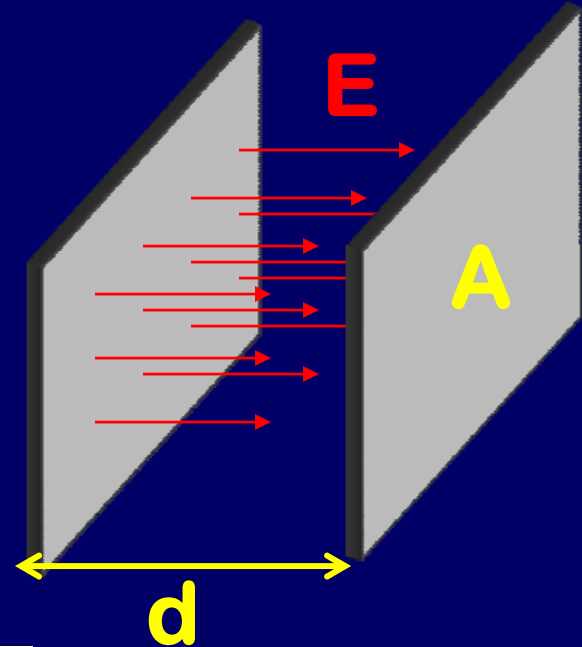
## Electric Fields

- Recall Capacitor Energy:

$$U = \frac{1}{2} C V^2$$

- Energy Density (U/Volume):

$$u_E = \frac{1}{2} \epsilon_0 E^2$$



$$C = \frac{\epsilon_0 A}{d}$$

$$V = Ed$$

$$U = \frac{1}{2} CV^2 = \frac{1}{2} \frac{\epsilon_0 A}{d} E^2 d^2 = \frac{1}{2} \epsilon_0 E^2 Ad$$