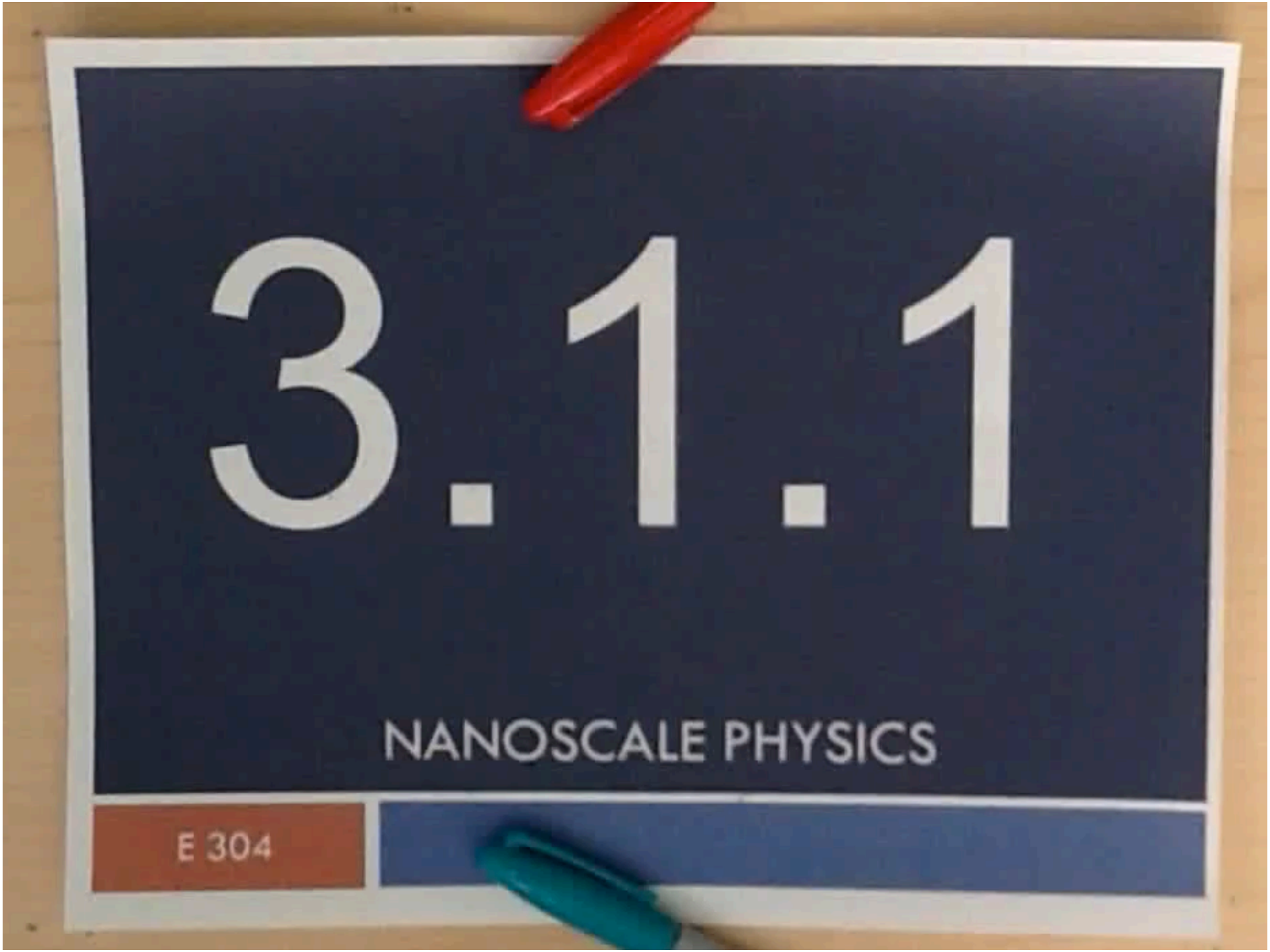
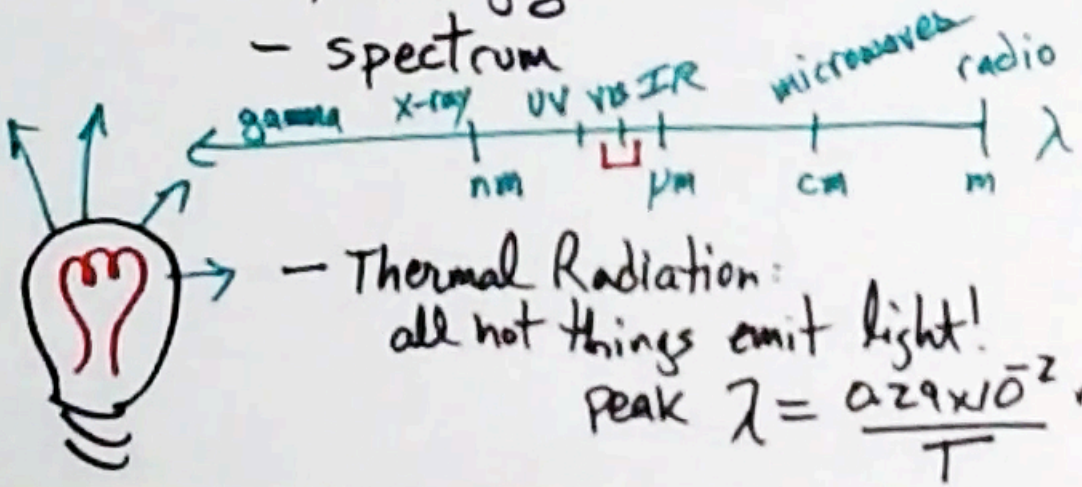

3.1.1
NANOSCALE PHYSICS
E 304

1900s (early) "Classical" Physics

- Electrons: nice particles, obey classical mechanics
- Light: is a wave
  - wavelength, frequency, speed $c = f\lambda$
  - energy
  - spectrum



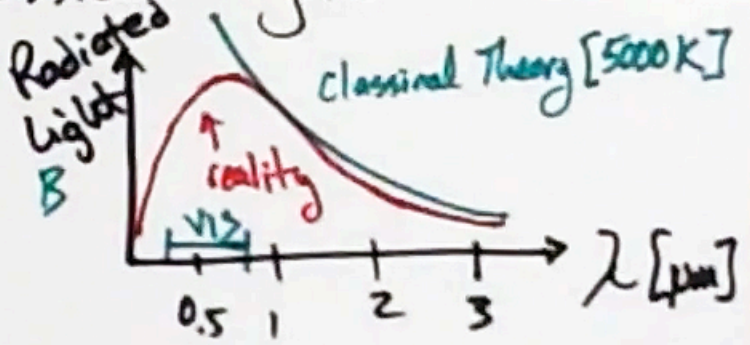
- Thermal Radiation:
  all hot things emit light!

$$\text{Peak } \lambda = \frac{2.9 \times 10^{-2}}{T} \text{ m·K}$$

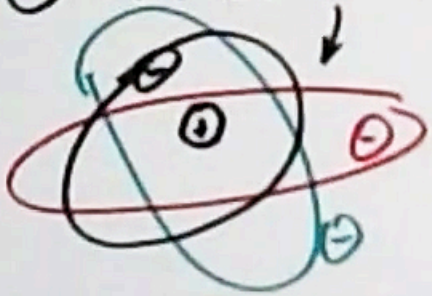
Challenges to Classical Physics

① UV Catastrophe

$$B = \frac{2ckT}{\lambda^4}$$



② Rutherford Atom



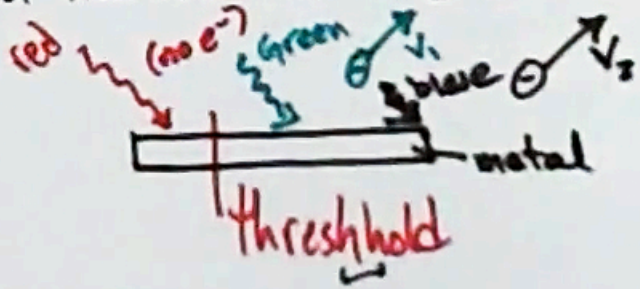
reality

→ Note: Maxwell teaches us that accelerating charges must emit radiation. (lose energy)

(3) Photoelectric Effect

→ A. Einstein

→ light incident on certain metals (eg, Potassium)



(A) there is a threshold freq

(B) max kinetic energy has nothing to do w/ light intensity, only the light's frequency.