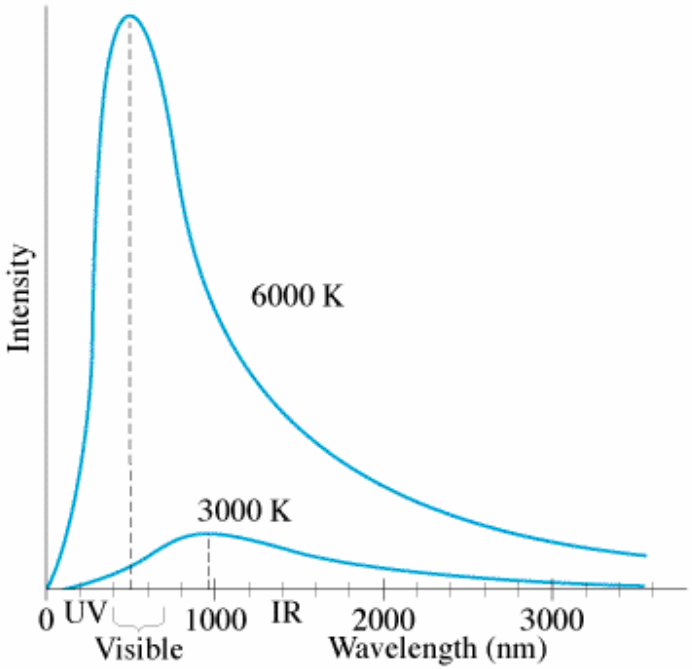
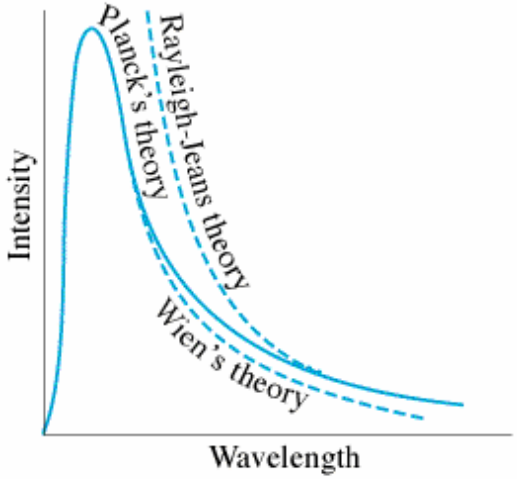
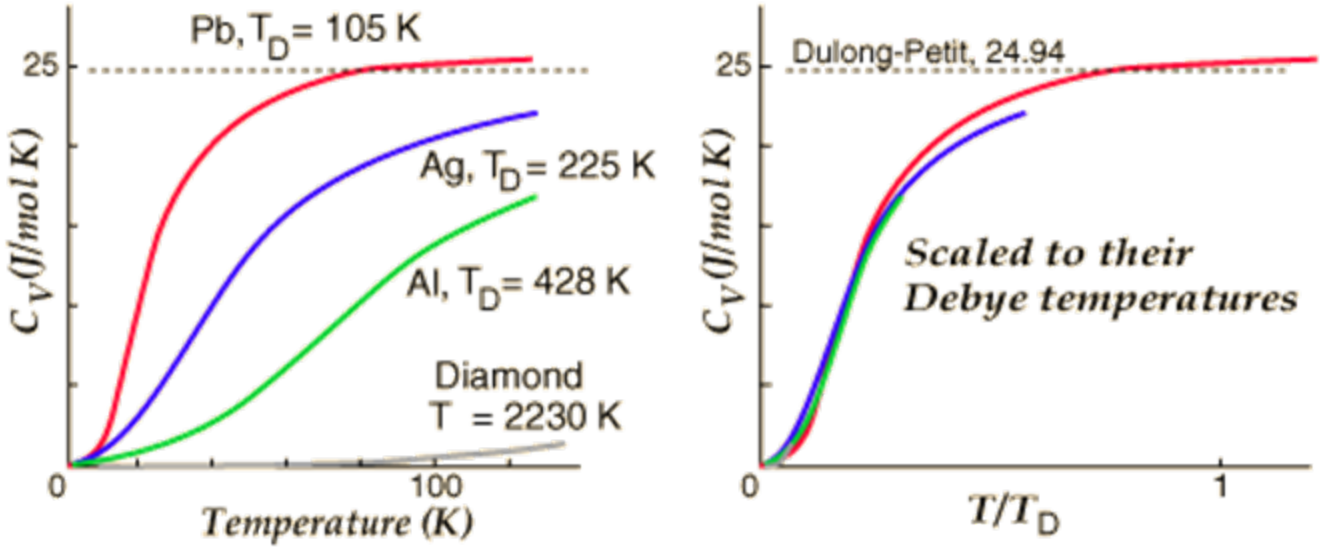
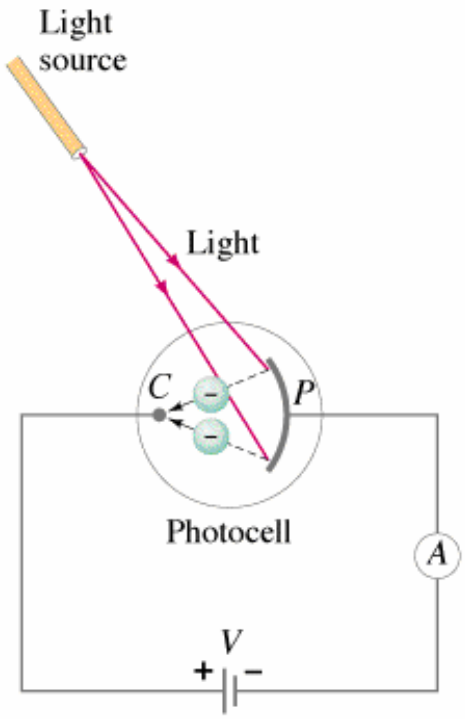
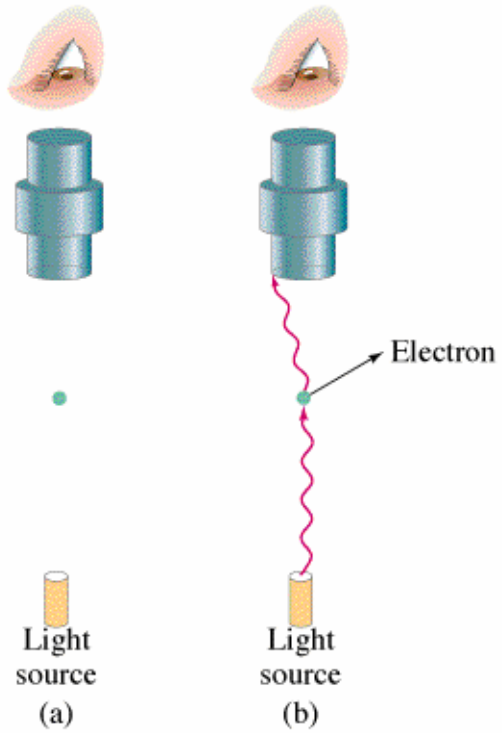

Intensity
6000 K
3000 K
0
UV
Visible
1000
IR
2000
3000
Wavelength (nm)

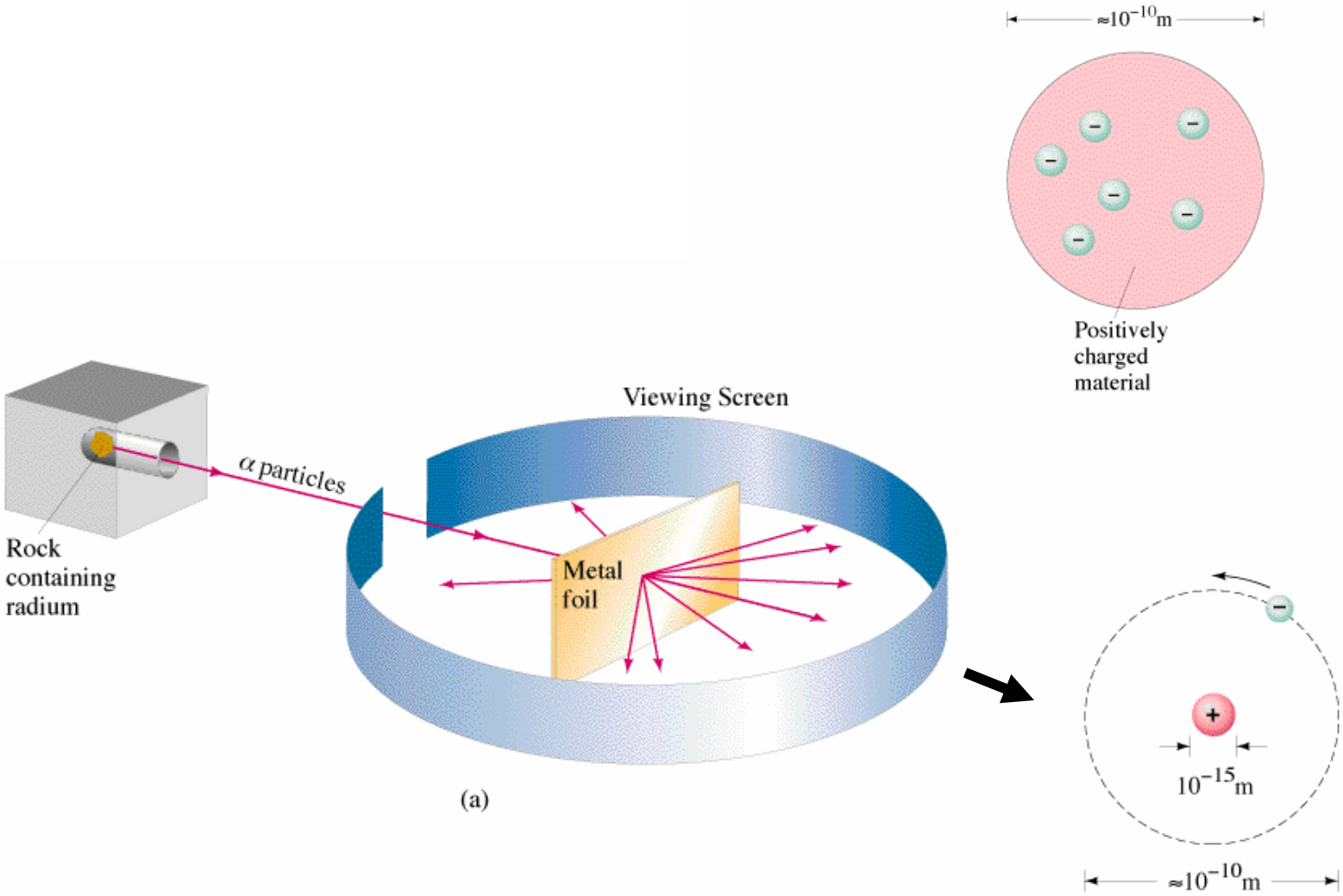

Intensity
Planck's theory
Rayleigh-Jeans theory
Wien's theory
Wavelength


Pb, T_D= 105 K
25
Ag, T_D= 225 K
Al, T_D= 428 K
Diamond
T = 2230 K
0
100
Temperature (K)
C_V(J/mol K)
Dulong-Petit, 24.94
25
Scaled to their
Debye temperatures
0
1
T/T_D
C_V(J/mol K)

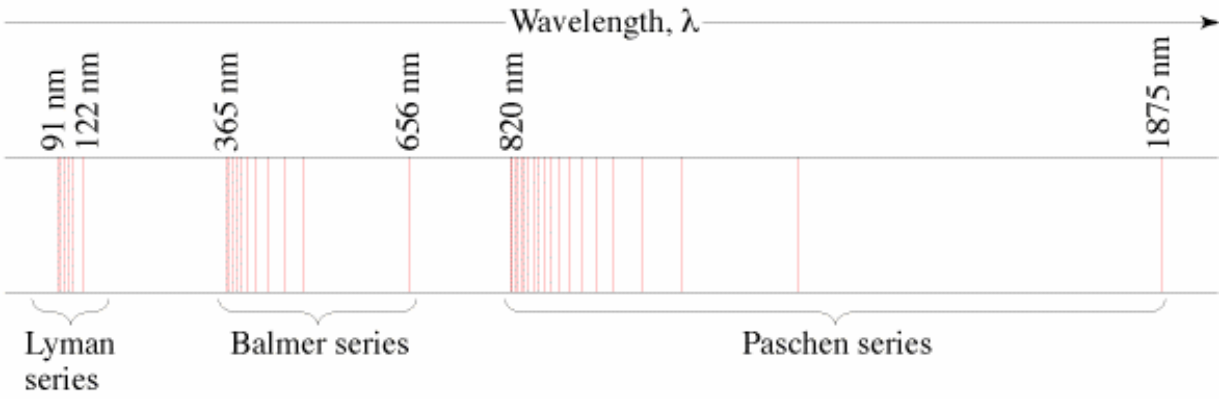

Light
source
Light
C
P
Photocell
A
V
+
−

$$\Delta x \cdot \Delta p \geq \hbar \qquad \Delta t \cdot \Delta E \geq \hbar$$




≈10⁻¹⁰m
Positively charged material
Viewing Screen
α particles
Rock containing radium
Metal foil
(a)
10⁻¹⁵m
≈10⁻¹⁰m

$$\frac{1}{\lambda} = R\left(\frac{1}{n'^2} - \frac{1}{n^2}\right), \quad n = n'+1, n'+2, n'+3, \ldots$$

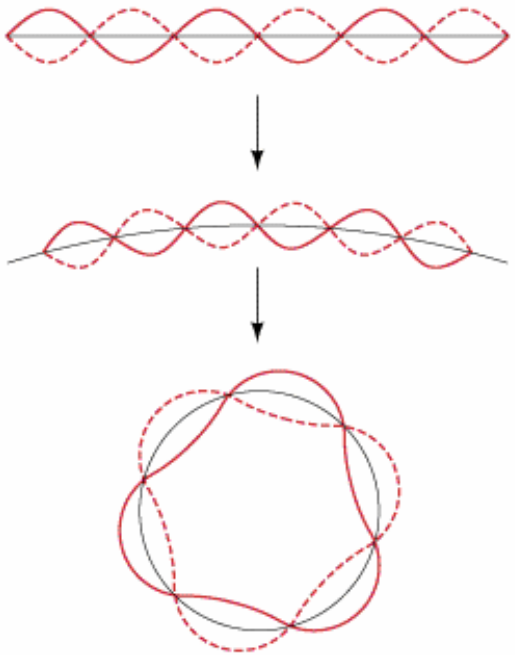


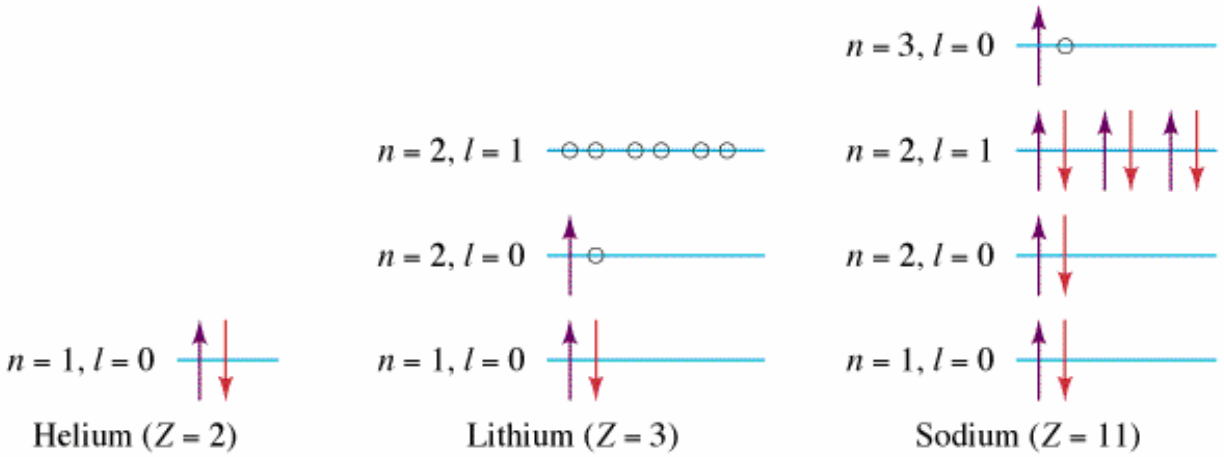
$$mvr = n\hbar$$

$$r_n = \frac{n^2}{Z} r_1 \quad n = 1,2,3,\ldots \qquad E_n = \frac{Z^2}{n^2} E_1 \quad n = 1,2,3,\ldots$$

$$\frac{hc}{\lambda} = E_n - E_{n'}$$

$$\frac{1}{\lambda} = R\left(\frac{1}{n'^2} - \frac{1}{n^2}\right)$$




n = 1, l = 0
Helium (Z = 2)
n = 2, l = 1
n = 2, l = 0
n = 1, l = 0
Lithium (Z = 3)
n = 3, l = 0
n = 2, l = 1
n = 2, l = 0
n = 1, l = 0
Sodium (Z = 11)