Interference and Diffraction (continued)

Thin films:
$2t = m\lambda_n$ constructive interference
$2t = (m + 1/2)\lambda_n$, destructive interference
(situation reversed for l/2λ phase change at boundary)

Relativity

$$\Delta t = \gamma \Delta t_0,$$

$$\Delta \ell = \frac{\Delta \ell_0}{\gamma},$$

$$\gamma = \frac{1}{\sqrt{1 - u^2/c^2}}.$$

$$f = \sqrt{\frac{c+u}{c-u}} f_0$$

$$v_x = \frac{v_x' + u}{1 + u v_x'/c^2}$$

$$\vec{p} = \gamma m \vec{v}$$

$$K = (\gamma - 1) mc^2$$

$$E = \gamma mc^2$$

$$E^2 = (mc^2)^2 + (pc)^2$$

Photons, Electrons, and Atoms

$$E = hf$$

$$hf = (E_i - E_f)$$

$$E_n = -13.6\,eV/n^2, n = 1,2,3...$$

$$eV_0 = hf - \phi$$

$$p = E/c \quad \text{(photon)}$$

$$\lambda - \lambda' = \frac{h}{mc}(1 - \cos\phi)$$

$$L_n = n\frac{h}{2\pi}$$

$$eV_{AC} = hf_{max}$$

$$I = \sigma T^4$$

Constants and Conversions

2π radians =360 degrees
h = 6.626×10^{-34} J·s
1 eV = 1.602×10^{-19} J
e (charge on proton) = 1.602×10^{-19} C
k = $1/(4\pi\varepsilon_0) = 8.988 \times 10^9$ $N \cdot m^2/C^2$