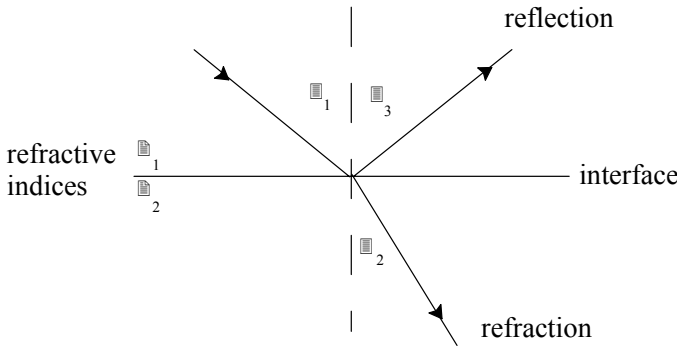
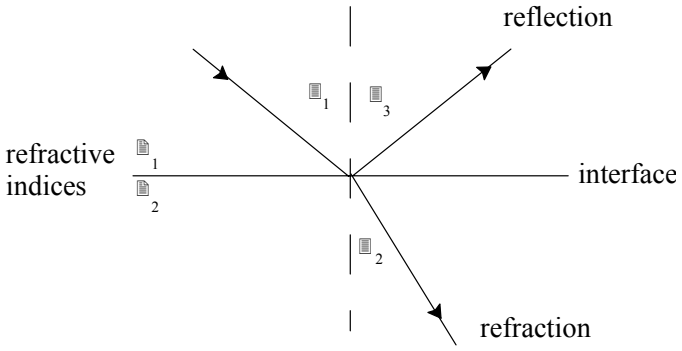
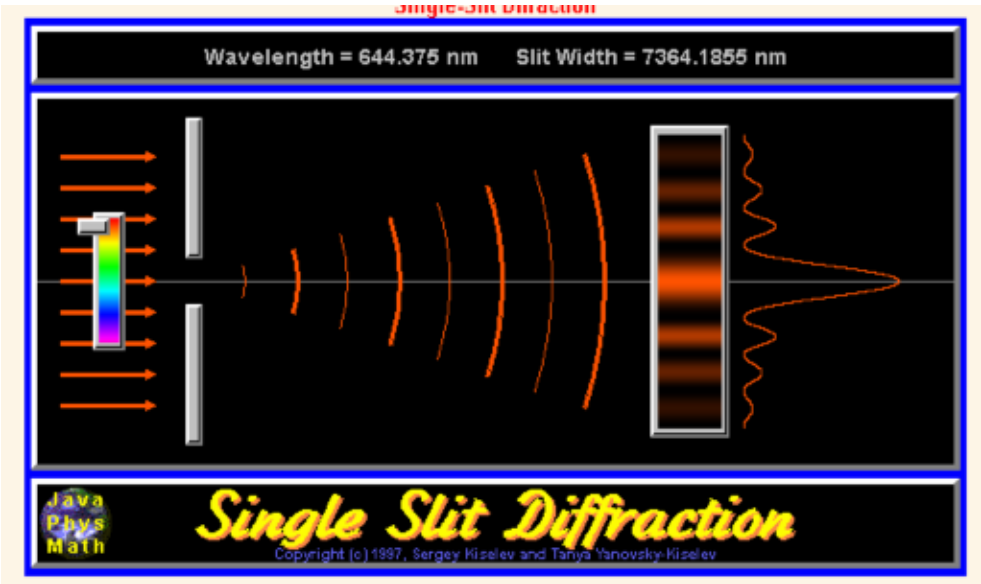
Lecture 7
Summary of optical phenomena and properties

Concept or process	Equation or variable name	Equation and (or) diagram
The Conservation Law	Spectral absorptance Spectral reflectance Spectral transmittance	
Refraction	Refractive index (η) Snell's law Of refraction	
Dispersion		

Reflection specular diffuse	Fresnel equation (monochromatic normal beam)	
Internal reflection	Critical angle $\sin\theta_{critical}$ smallest θ_1 Where $\theta_2 > \pi/2$	
Absorption	Beer's law	

Interference (superposition) Constructive Destructive		
Diffraction: Single slit		minima where $W\sin\theta = m\lambda$ or $\sin\theta = m\lambda/W$ angular width of central maximum $\approx \lambda/W$ physical half-width of central maximum at distance b from slit $\approx b\lambda/W$ distance between side fringes = λ/W see Fig. LN3

Diffraction: Multiple slits		maxima at $d\sin\theta = m\lambda$ or $\sin\theta = m\lambda/d$ angular width $= \lambda/Nd$ distance between fringes $= \lambda/d$ see Fig. LN3A-1 & -2



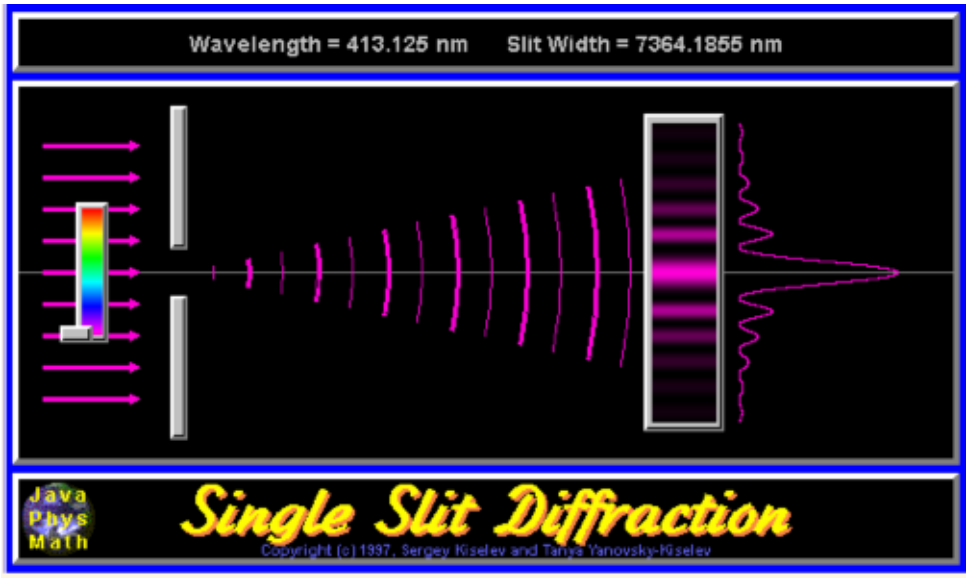


Fig. LN3A-1. Single Slit Diffraction. taken from
http://webphysics.ph.msstate.edu/javamirror/ipmj/java/slitdiffr/index.html

Comparison of single and multiple slit diffraction
Fig. LN3A-2. Single- and Multiple Slit Diffraction. taken from http://hyperphysics.phy-astr.gsu.edu/hbase/phyopt/mulslid.html#c3