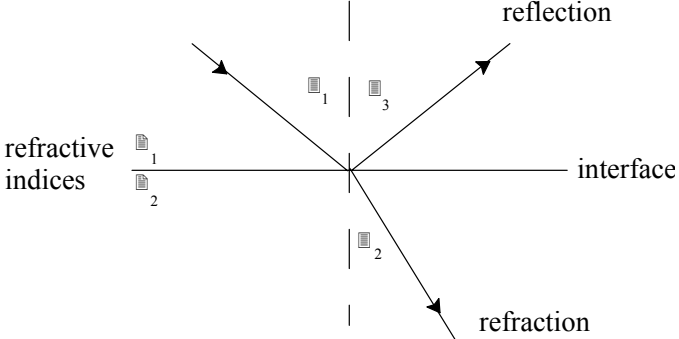
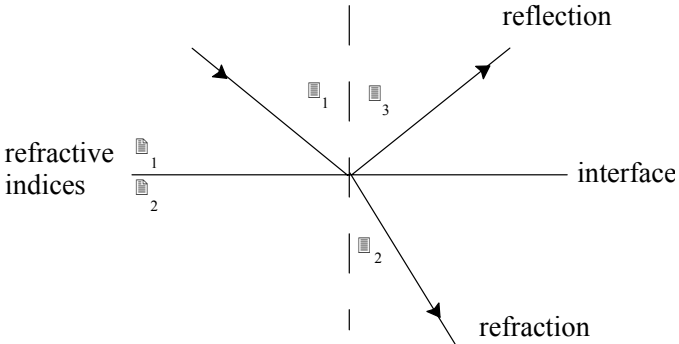


# Lecture 7

## 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 ( $\eta$ )  Snell's law Of refraction	 <p>The diagram illustrates the refraction of light at an interface between two media. A horizontal line represents the interface. A vertical dashed line represents the normal. An incident ray in medium 1 (refractive index <math>n_1</math>) strikes the interface at an angle <math>\theta_i</math>. Part of the ray is reflected back into medium 1 at an angle <math>\theta_r</math>, labeled 'reflection'. The other part is refracted into medium 2 (refractive index <math>n_2</math>) at an angle <math>\theta_t</math>, labeled 'refraction'. The labels 'refractive indices' and 'interface' are also present.</p>
Dispersion		

<p>Reflection</p> <p>specular</p> <p>diffuse</p>	<p>Fresnel equation (monochromatic normal beam)</p>	 <p>refractive indices</p> <p>interface</p> <p>reflection</p> <p>refraction</p>
<p>Internal reflection</p>	<p>Critical angle  <math>\sin \theta_{critical}</math>  smallest <math>\theta_1</math>  Where  <math>\theta_2 &gt; \pi/2</math></p>	
<p>Absorption</p>	<p>Beer's law</p>	

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

<p><b>Diffraction: Multiple slits</b></p>		<p>maxima at <math>d\sin\theta = m\lambda</math> or <math>\sin\theta = m\lambda/d</math></p> <p>angular width = <math>\lambda/Nd</math></p> <p>distance between fringes = <math>\lambda/d</math></p> <p>see Fig. LN3A-1 &amp; -2</p>
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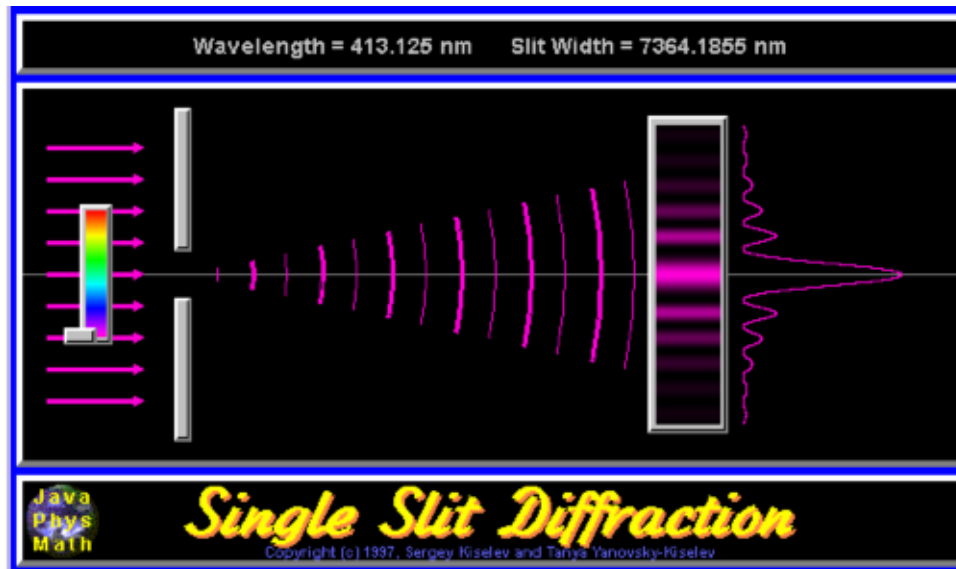
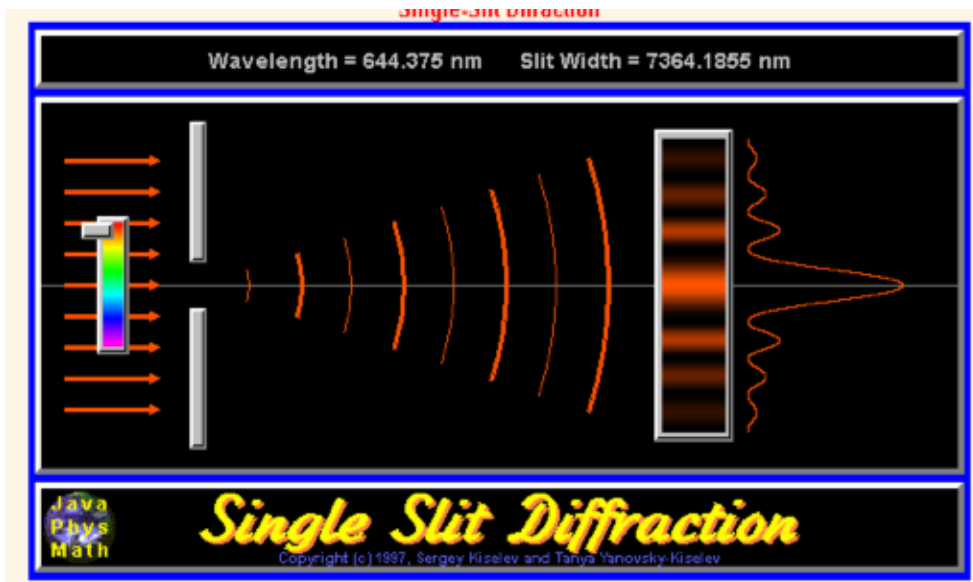


Fig. LN3A-1. Single Slit Diffraction. taken from <http://webphysics.ph.msstate.edu/javamirror/ipmj/java/slitdiffr/index.html>

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/multslid.html#c3>

