Lab 16: Light Dispersion

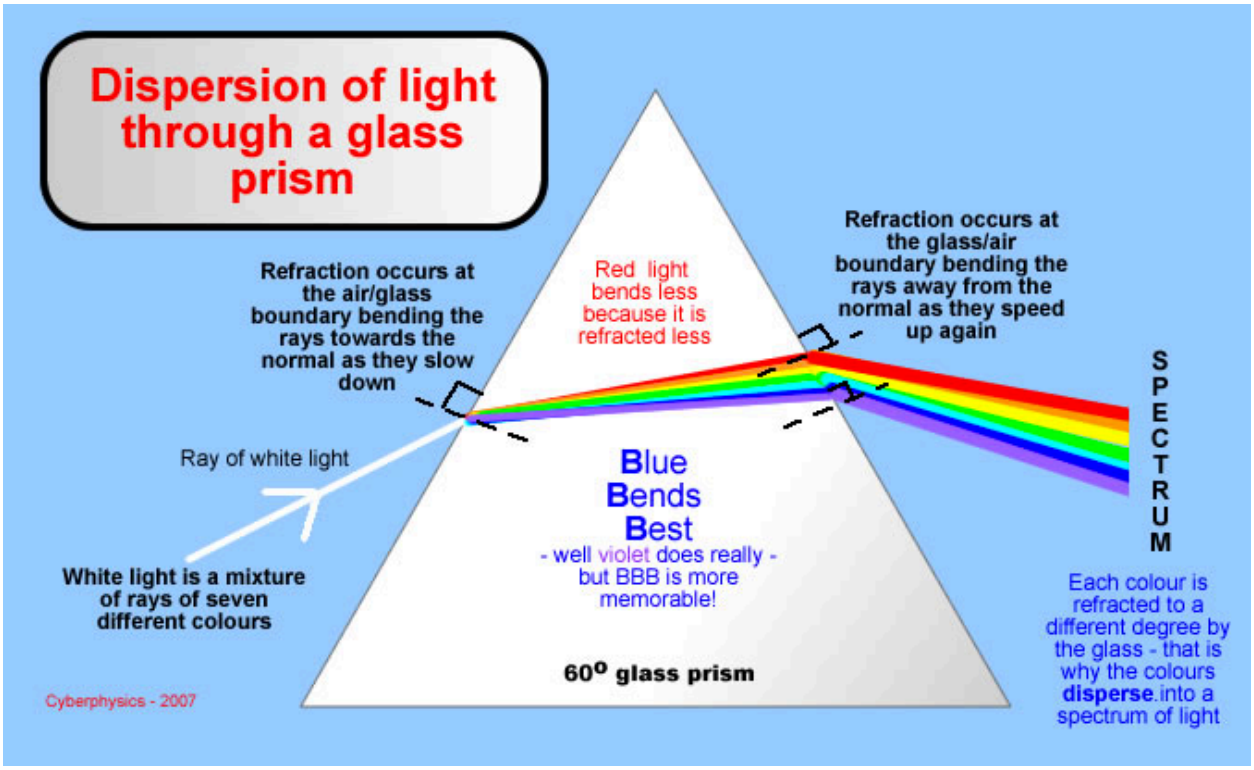
Purpose

To produce a color spectrum from white light and white light from a spectrum of colors.

Introduction

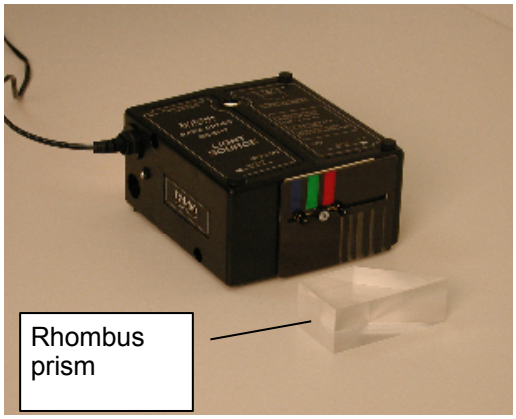
You may have seen the iconic image on the cover of Pink Floyd's *Dark Side of the Moon,* or one of the most famous images of Isaac Newton showing him using a prism to separate sunlight into a spectrum of colors (a rainbow). On this lab you will do that your self.

The process of separating white lights into the spectrum of visible colors is called ***dispersion.*** Pure white light consists of all the colors of the spectrum, but different colors (frequencies) refract to different extents. Purple light (highest frequency) refracts more than red light (lowest frequency). This allows the prism to separate (disperse) the colors through differential refraction. The prism is capable of a wide dispersion when the differential refraction of light upon entering the prism is enhanced by differential refraction upon exiting the prism.



Experiment 1: Colors From White Light

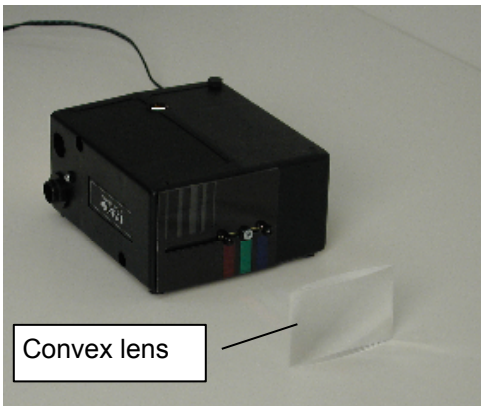
Procedure



1. Place the light source on the table and adjust the mask on the front of the light source to produce a single ray.
2. Place the rhombus prism from the Ray Optics Set in front of the light source along the path of the ray.
3. Hold the viewing screen about 20 cm behind the rhombus prism.
4. Slowly rotate the rhombus prism such that the angled surface of the prism is rotating towards the light source. Make sure the ray of light passes through the prism.
5. Observe the spectrum of colors forming on the screen and explain what is happening.

Experiment 2: White Light From Colors

Procedure



1. On the light source, slide the mask in front of the light to produce rays of red, green, and blue.
2. Place the convex lens in front of the color rays as shown in the illustration.
3. It helps if you place the light source and the convex lens on top of a white sheet of paper.
4. Place another sheet of paper (a screen) behind the convex lens.
4. Slowly move the viewing screen until you find the position where all three colors intersect. What do you see on the screen?
5. Move the screen past the point where all three colors intersect. What do you see?

Analysis

Complete the Lab 16 quiz on Canvas/iLearn.