**ASTR 503 Homework 4: Properties of Light**

Always use **scientific notation,** always **give units**, and **show your steps!**

This activity requires a diffraction grating (either in special slides or as special diffraction glasses, available from "Rainbow Symphony". Special punch-out spectroscopes are available from the Stanford Solar Center. I will provide one for every teacher registered for audit or CEU credit, and a full classroom set for each teacher registered for full credit, but only on request since they are no longer being made.

If you did this in class as an activity, please only do two more sources on the printed activity (#2) and use the printout to sketch in the lines you observed in class.

1. Assemble the spectroscope per the directions. Or if you don't have a spectroscope, just use the diffraction glasses or a diffraction slide. Holding a white card in front of the spectrum (to the side left or right) makes the spectrum more visible. If you hold (or mount) the slide with the longer edge horizontally, the spectrum will appear to the right AND to the left of the source image. For the slides I provide, if you can read the writing, it is the correct way up.

2. Do the “Colors of light" activity from "Space Update": <http://www.spaceupdate.com/activities_spaceupdate.php>. The pdf can be downloaded directly from: <http://www.spaceupdate.com/activities/AS02_colors_of_light.pdf>.

If you use the spectroscope, try to estimate the wavelength of the brightest lines observed from each of the sources. (The spectroscope basically creates a vertical slit to make a vertical line source). Or use the printout and make a vertical pencil line below the appropriate color on the spectrum. Use one row for each different source. If you are observing a neon sign, try to observe a vertical part of the neon tube so that the spectrum spreads out without overlapping.

You can (approximately) calibrate your wavelength scale by putting on the provided scale on the back so you see it through the spectroscope (to the right as you are holding it). The bright red line of Hydrogen is called H-alpha. Its wavelength is 656.28 nm.

We will have several sources available in class, but there are others listed on the activity sheet that can be used. Be sure to answer the questions on the sheet. Note when you look at stoplights or tail lights, can you tell from the spectrum which are incandescent and which are LEDs? How does an LED tail light look compared to an (older) incandescent tail light?

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