# Supernova Chemistry

## Lab procedure

### Summary

You are going to be observing the spectra of several different light sources and learning how this type of spectroscopy can be used to help astronomers tell what elements are out in the Universe.

### Safety

Wear safety glasses throughout this activity. The devices used in this experiment to power the gas-filled tubes use a very high voltage of electricity.

Do not remove the gas-filled tubes or insert metal objects such as pens or paper clips into the power devices. The gas-filled tubes will be very hot to the touch, so be careful to not touch the surfaces.

### Procedure

Go through each observation station with your lab group. Use the spectrometer placed at each station to take your measurements. Everyone will start at different stations and move through the lab to complete their observations in the time established by your teacher. When observing the light from a gas tube, make sure that the center of the glowing spectrum tube is very close to and directly in front of the spectrometer slit.

CAUTION: Do not touch the gas tubes because they are hot and may give you an electrical shock!

1. Incandescent light bulb (white light)

Sketch what you see on the diagram below, marking the wavelengths that define each colored region. Also, mark the limits of your visual range on both ends of the spectrum. Sketch the range of colors observed using the colored pencils and note regions where the colors are most bright and most dim.

### Hydrogen gas tube

Measure and draw the wavelength of any line spectra that appear on the blank spectrum on your data sheet. Sketch the range of any colors observed using the colored pencils and note regions where the colors are most bright and most dim.

### Helium gas tube

Measure and draw the wavelength of any line spectra that appear on the blank spectrum on your data sheet. Sketch the range of any colors observed using the colored pencils and note regions where the colors are most bright and most dim.

### Neon gas tube

Measure and draw the wavelength of any line spectra that appear on the blank spectrum on your data sheet. Sketch the range of any colors observed using the colored pencils and note regions where the colors are most bright and most dim.

### Mercury gas tube

Measure and draw the wavelength of any line spectra that appear on the blank spectrum on your data sheet. Sketch the range of any colors observed using the colored pencils and note regions where the colors are most bright and most dim.

### "Plant Grow" light bulb

This is a bulb that is supposed to provide more light in the wavelengths that plants use than normal light bulbs. Sketch what you see, marking the wavelengths that define each colored region. Mark the limits of your visual range on both ends of the spectrum. Sketch the range of any colors observed using the colored pencils and note regions where the colors are most bright and most dim.

### Chemical Light Sticks

These light sticks work by a chemical reaction which releases light energy instead of heat, sound, or electricity as other reactions may do. The reaction is very similar to the one that occurs in the tails of fireflies! On your data sheet, sketch what you see, marking the wavelengths that define each colored region. Also, mark the limits of your visual range on both ends of the spectrum. Sketch the range of any colors observed using the colored pencils and note regions where the colors are most bright and most dim.