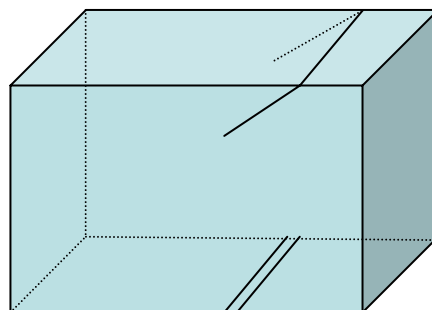


Build a CD Spectrometer

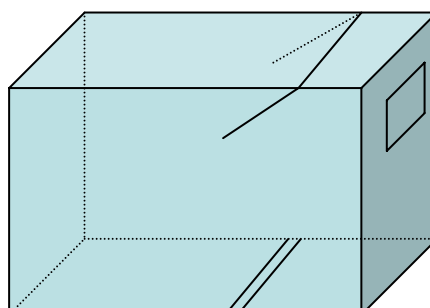


These are simple instructions to make a Solar Spectrometer for use in the '**Secrets of the Sun**' planetarium programme for *International Heliophysical Year 2007*. It's a fantastic piece of kit that can be used to study the spectrum of not just the Sun, but any source of light.

- 1). Take an empty cereal box and cut a slot on one of the long sides near the end. The slit should not be too wide, otherwise the spectrum lines will be blurred. It should not be too narrow either, otherwise the spectrum is too dim. Make another slot opposite the first one at a 45° angle. (If using scissors it is easier to cut the box if you squeeze the two sides of the corner together).

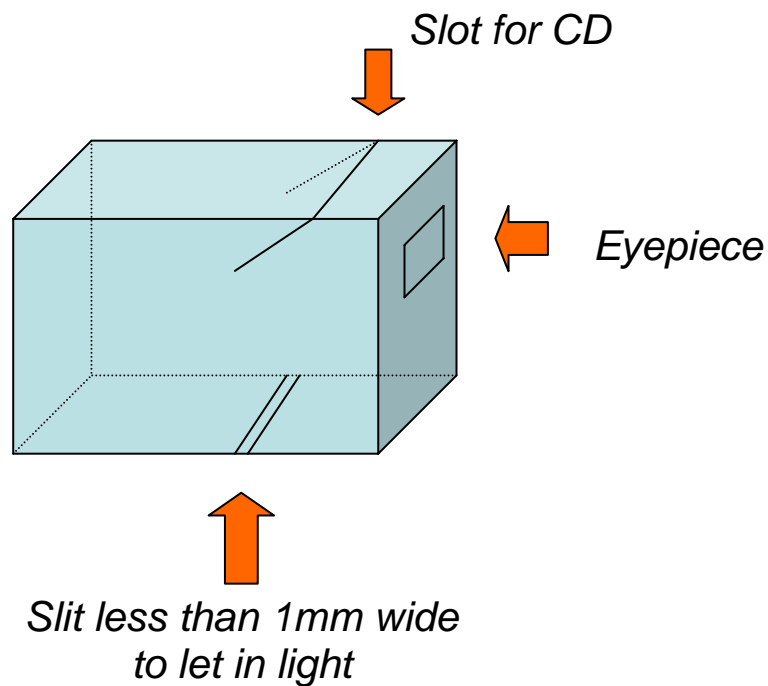


- 2). On the short edge nearest the slot cut a hole (eyepiece) that enables you to look at the CD. (If you make a small piercing first with a pencil/pen cutting is easier).



3). Make sure that your CD is placed into the slot the right way around. It should have the side that makes the rainbow effect facing towards the eyepiece hole.

4). Your Spectrometer already has a small slit (less than 1mm) to let in light. Aim this slit at a good light source and look through the eyepiece. You should see light from the slit reflected onto the CD and split by the CD into the 7 colours of the Rainbow.

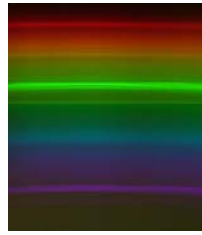


5). Tilt the box up and down to see the Spectrum.

6). The next page shows you images of what you can expect to see in your spectrometer, not just the Sun, but any source of light. These images are provided courtesy of **Jerry Xiaojin Zhu** of *the University of Wisconsin-Maddison, USA*.



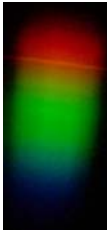
a). An incandescent light bulb. A continuous spectrum.



b). A fluorescent tube. Notice the strong lines against a continuous spectrum.



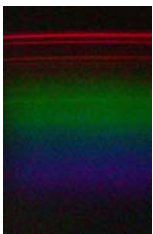
c). A candle flame. A continuous spectrum.



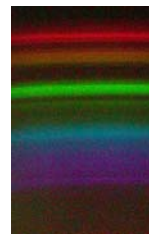
d). A candle flame with some salt sprinkled into it. Notice the yellow (Sodium line) compared to c).



e). A high pressure sodium lamp (modern street light). Notice the strong Sodium absorption (black line) in the Yellow).



f). A white page on a CRT computer screen.

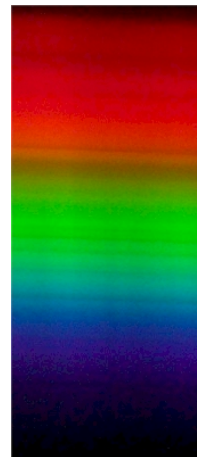


g). A white page on a laptop computer screen. Notice the similarity to a fluorescent tube b).

And finally ... what you should be looking at.



h). The Sun high in the sky during the daytime. Notice the dark absorption or *Fraunhofer lines*. These can be seen for the elements, Hydrogen, Sodium, Iron, Magnesium and Calcium.



i). The Sun low in the sky towards sunset. Notice the difference in the spectrum from the daytime. The Sun's light passes through more of the Earth's atmosphere and we see an additional dark line in the red for Oxygen.

Remember: Never look at the sun with a telescope or binoculars. This can cause permanent blindness.



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