



The Astronomical League

A Federation of Astronomical Societies

Astro Note A1 – Observing the Sun

Introduction – The only observing that astronomers do that can be dangerous is observing the Sun. There are tools available that make these observations safe and enjoyable. It is important to follow all safety precautions.

Warning – Observing the Sun is dangerous. Never look at the Sun without proper protective filters. Looking at the Sun through astronomical equipment without the proper filters is many times more dangerous. Damage to your eyes may include blindness and be permanent.

Pin-Hole Projection – The safest way to observe the sun is by using a technique called pin-hole projection. You use two white pieces of cardboard. One is used as a projection screen. The other should have a pin-hole in it and is used as a projector. The one with the hole is held above the screen so that light from the sun passes through the hole and casts an image on the screen. This is safe as long as you are only looking at the Sun's image on the projection screen. **Never look at the Sun directly.**

Naked-Eye Observing – Eclipse glasses are commercially available from stores (when solar eclipses are expected) or on the internet. These are safe to use if they are from a reputable source and are undamaged. If there is a crease in the plastic of the lens or even a pin-hole in the lens then the glasses should be cut up and discarded. When you look at the clear sky (not at the Sun), you should see nothing through the glasses.

We have heard of many other alternatives, and they should not be used. They will not provide adequate protection for your eyes.

Binoculars and Telescopes – **Never use eclipse glasses with binoculars or telescopes.** Eclipse glasses are designed only to be used when viewing with your eyes (or with eyeglasses). They are unsafe because of the additional light that is received through equipment. Permanent eye damage and blindness may occur. A pair of 10x50 binoculars bring about 400 times as much light to your eyes and eclipse glasses are not safe.

The larger the aperture, the more light that is sent to your eyes. Filtering is critical to protect your sight. Some binoculars (solar binoculars) and telescopes (H- α telescopes and Calcium-K telescopes) are specifically designed for solar viewing. These will not be discussed here. Filters are available or can be made for binoculars and telescopes that

will make them safe to use for solar observing. All solar filters **MUST** go on the end where the light from the Sun enters the equipment. Do not use any other configuration. Filters made of coated glass are less likely to become damaged and are recommended over those filters made of coated plastic sheeting. Always check these filters in a clear sky (not at the Sun), to be sure they are undamaged before you use them.

Never look at the Sun without proper solar filters to protect your eyes.

Selecting Solar Filters – Selecting a solar filter is a critical process. Yours eyes are important to you for astronomy and life in general. Never risk them by looking at the Sun without proper protection. Always buy your filters from a reputable dealer and a reputable manufacturer. Look for evidence that they meet the ISO 12312-2 international safety standard.

The Astronomical League does not recommend specific vendors and we do not endorse any specific vendors. Although the American Astronomical Society does not endorse specific vendors either, they have researched and created a list of responsible manufacturers and retailers. To view their list, go to their website:

<https://eclipse.aas.org/resources/solar-filters>