The Otter Creek Astronomical Observatory

The Observer

June2006 (#4)

Public Programs at Otter Creek Observatory (through June 2006)

Evening Programs -- Join the observatory staff for a tour of what is visible in the night sky, including the moon, stars, and planets.

All evening programs are "weather permitting"--if the sky is not clear enough for celestial objects to be visible the observatory will not be open.

June 3, 2006
9:30 to 11:30 pm EDT

Daytime (solar) Programs -- Daytime programs are "open house" at the observatory. Come safely observe of the Sun, with its prominences and sunspots. Walk the model solar system trail and get a sense of the size of things in space. And learn about the observatory -- after all, you can't really see what's in the observatory when it is dark.

Daytime programs are held "rain or shine"--the observatory is open regardless of weather.

June 17, 2006
11:00 am – 1:00 pm EDT

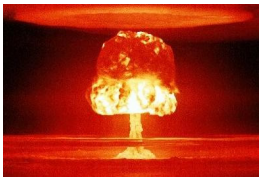
As of July 1, 2006 the observatory will temporarily close for overhaul and installation of new equipment. We will be removing our 10-inch Meade SCT and its mount and replacing it with a large refracting telescope with a custom-fabricated mount. We will also be installing new computer equipment. If all goes well we should reopen in late summer or early fall of 2006.

Otter Creek Observatory welcomes Henry Sipes and Sam Arslanian to the observatory staff!

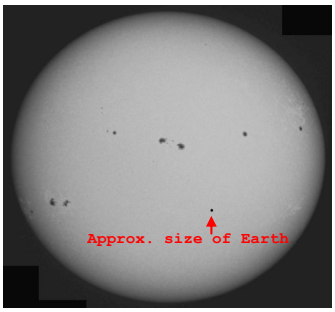
Visit the Otter Creek Observatory web page at

www.ottercreekpark.org

A good portion of the programs at Otter Creek Observatory focus on our Sun. Our Sun is a star. It is much, much closer than any other star, so it looks much, much brighter, and feels much, much hotter than the other stars that we see.



However, it is like any star -- a massive ball of Hydrogen which is being fused into Helium at a prodigious rate. The fusion process is a nuclear reaction which turns matter into energy ($E=mc^2$). The Sun is essentially a giant Hydrogen bomb that is constantly going off but that is kept from flying apart by the strength of its own incredible gravitational field. The Sun puts out unimaginable power. In one second the Sun generates as much energy as your local power company could generate in a couple billion years! It consumes matter and turns it into energy at an amazing rate -- in one second it devours the equivalent of 1.6 million full-sized pickup trucks! It is also unimaginably huge -- over 100 times the diameter of Earth.



The Sun Through a Safe Filter

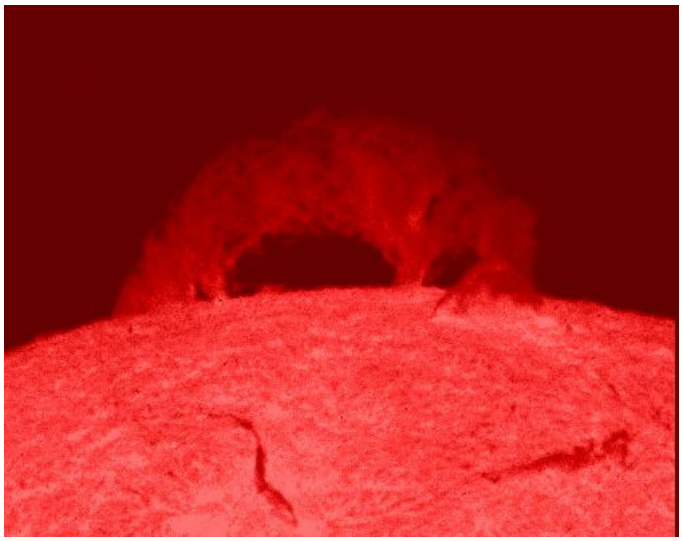
The Sun is much too bright to look at directly or with an unfiltered telescope; without appropriate protection, you could damage your eyes. However, if you use a safe filter that blocks enough of the Sun's light to make it safe to look at, you will see a view of the Sun much like the images on this page.

A safe filter lets you see the "surface" of the Sun, known as the *photosphere*. The photosphere is very hot -- about 10,000 ^{o}F! That's why the Sun gives off light -- it is so hot it is incandescent, much like the filament of an incandescent light bulb. However, the interior of the Sun is even hotter (millions of degrees). That is where the fusion occurs that powers the Sun. The energy from the core makes its way to the photosphere, dissipating enough that the photosphere is relatively "cool" compared to the core (if you can call 10,000 ^{o}F "cool"). However, there are areas on the Sun's surface where powerful magnetic fields hinder the rise of energy from the core to the surface. At these locations the Sun's surface is "cooler" still -- merely 6,500 ^{o}F or so. Because these areas are so "cool", they aren't as incandescent as the rest of the Sun's surface, and therefore appear as darker spots on the Sun's surface. These are known as *sunspots* and can be seen through a safe filter.

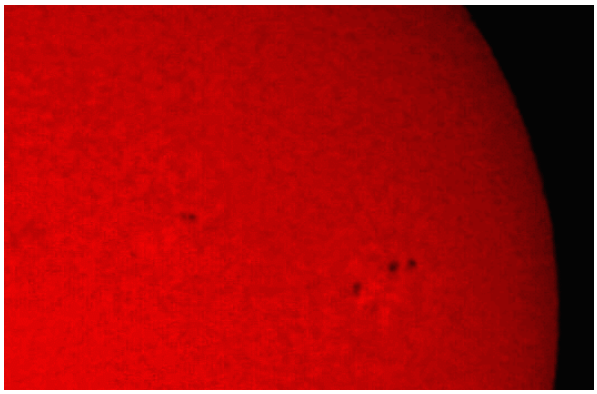
What is a safe solar filter?

A safe filter does more than just block enough light from the Sun to make the Sun comfortable to look at. It also blocks radiation other than light (such as infrared or UV) which can harm your eyes. The best bet for an inexpensive but safe filter? Shade 14 welder's glass which you can purchase for a few dollars at a welding supply store (also available from internet supplies).

The Sun Through a Hydrogen-Alpha Filter



The Sun emits most of its light because it is so hot that it is incandescent. However, it also emits some light due to the fact that certain gasses in the Sun have been pumped with energy. If we block the light produced by incandescence and only look at the light given off by these gasses, we can see a lot of very interesting things on the Sun. Otter Creek Observatory's Hydrogen-alpha ("H-α") telescope does just this. It blocks all light except for a reddish color of light given off by energy-pumped Hydrogen gas. While a regular filter lets you see the Sun's surface or *photosphere*, a H-α telescope lets you see the Sun's lower atmosphere or *chromosphere*. Through a H-α telescope you can see much more activity on the Sun -- including *prominences* (clouds of material that have been lifted above the chromosphere), *granules* ("bubbles" of hot material rising from the interior of the Sun that are each more than fives times the size of the state of Kentucky), and *plages* (patchy bright areas on the Sun where the chromosphere is a little hotter and denser that its surroundings). Sometimes these features can change very rapidly, making the Sun one of the few astronomical bodies that can change in appearance right before your eyes.



Images used in this newsletter are either from Otter Creek Observatory or are images in the public domain from NASA web pages.