

## **“Spots on the Sun”**

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Sunspots are dark regions observable on the visible surface of the sun. They appear dark on the surface because they are a few thousand degrees cooler than their surrounding surfaces. This does not imply that you can safely view them with the naked eye as they are over 7,000 degrees and extremely bright. Now is a good time to remind everyone to never look directly at the sun. Blindness can be painless and occur immediately. Only look through a properly filtered telescope such as the ones that are provided at the Cameron Park Community Observatory’s solar events.

The visible surface of the sun is the photosphere and is comprised of a layer of ionized gas called plasma. This plasma carries and releases the energy originating from the fusion process at the center or core of the sun through convection. It is now thought that this plasma is carried across the sun by giant “conveyer belts” on each side of the sun’s equator. If you can imagine looking at the surface of a boiling pot of water you will get a good idea of what the sun’s surface is doing. The sun’s magnetic poles can produce magnetic lines that cause a disruption in the convection or distribution of heat thereby resulting in sunspots. Sunspots range in size from a couple thousand miles to 50,000 miles in diameter (Earth’s diameter is about 8,000 miles) and are roughly circular in shape. They typically last several days but can last for weeks. They don’t appear randomly over the surface but are actually concentrated in two bands on either side of the equator.

Galileo Galilei and his contemporaries first discovered sunspots in the early 1600’s but it wasn’t until the middle 1800’s that a sunspot cycle was discovered. This cycle starts from nearly zero, increases to over 100 and then goes back down to zero. These cycles have been averaging 11 years. Good observational data has allowed scientists to start cycle 1 from 1755-1766. We are now in cycle 24 which started about January 2008. There was a period between 1645 and 1710 now called the “Maunder Minimum” where very little sunspot activity occurred. This coincided with part of Europe’s “Little Ice Age” where there was a very long term cold period. Solar cycle 19 (1954-1964) was the highest recorded year for sunspots. The year 2008 had the least sunspot activity on record since 1913. Can we predict activity? Unfortunately no, as many scientist felt 2008 would be a great year for sunspot activity. There is much current debate as to whether sunspot activity (or lack of) directly affects the earth’s temperature.

The Solar and Heliospheric Observatory (SOHO) was launched in 1995 to study the sun and has also discovered 1,500 comets. The Solar Dynamics Observatory (SDO) was launched February 2010 with one of its prime objectives to better understand the solar cycle. Both are orbiting the sun sending back amazing pictures and videos we never thought possible. More information along with current images for both spacecrafts can be seen at [www.nasa.gov](http://www.nasa.gov).

Want to safely view the sun and its visible features? Come join the Cameron Park Rotary Club Community Observatory’s Solar Team on Saturday June 12, 2010 from 11:00 am to 1:00 pm for a free solar viewing. Several solar telescopes and knowledgeable docents will be available, providing you an opportunity to become more familiar with our nearest star, the sun. The next Heavenly news article will

discuss the other visible objects on the sun and the types of telescopes used to view them. See you then. For more information about the Community Observatory go to [www.communityobservatory.com](http://www.communityobservatory.com)