LOST PLEIAD OBSERVATORY

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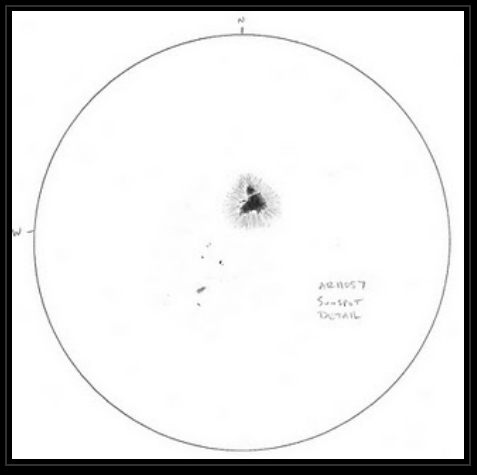
WEDNESDAY, MARCH 31, 2010

Anatomy of a sunspot

Yesterday I was observing the Sun around mid-day and was quite surprised at how steady the atmosphere was. With temperatures steadily climbing into the upper 80's and a slight breeze I had expected average conditions. Instead, I was able to push the magnification on my scope to approximately 140X, allowing for a critical observation of the Sun in white light- this is unusal as the best observing is usually shortly after sunrise before the atmosphere has substantially warmed up.

To observe the sun in white light, I am using my TEC 140 APO along with a Lunt Solar Systems Herschel Wedge. This combination allows for observation of the chromosphere - which is the outer layer of the Sun. It is sometimes referred to as the surface of the star, however, this is not really accurate as the chromosphere is simply a layer of gas, and does not have a surface to speak of. This is the layer of the sun that, if it were safe to look directly at the sun (**and it is not!**), would appear to the eye. The Herschel wedge, along with a neutral density filter (akin to the glass in a welders helmet) and a polarizing filter on the eyepiece allow for observation of granulation, faculae, and sunspots.

As a result of the very calm atmosphere, I was able to make a fairly detailed sketch of the main spot associated with active region 11057 which is currently on the face of the sun. The dark central portion of the spot is called the ***umbra***, and the gray area surrounding the umbra is called the ***penumbra***. Notice the radial structure of the penumbra. These penumbral filaments, are carrying material out from the sunspot at velocities of a few thousand meters per second! In terms of size, the central umbral region of the spot is probably in the neighborhood of 3-5 earth diameters...pretty impressive no? Sunspots are cooler than the surrounding areas and while they appear dark against the extrememly bright face of the sun, they are actually quite radiant themselves and were they not set in front of the sun would be bright sources of light.



This is a beautiful image of the sunspot taken near the time of my sketch. The picture was taken by Stephen Ramsden of Atlanta, Georgia who is a NASA Solar System Ambassador and accomplished solar observer. The picture also reveals the solar granulation. The solar granules are pockets of hot gas rising in the solar atmosphere. When these bubbles get high enough,

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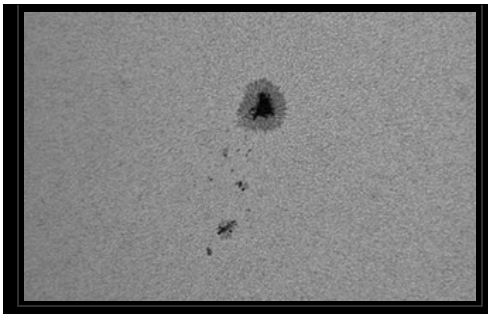

they relase energy through radiation, cool, and sink back down along the dark and irregular honeycomb lines. The granulation pattern is quite random and changes quickly with individual bubbles appearing a dissapearing within minutes.

POSTED BY ALAN AT 12:02 PM

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ABOUT ME

ALAN

I have been an amateur astronomer for the past 10 years. I hold a PhD in Rehabilitation, and currently work at the University of Arizona.

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