nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

Volume 33 Number 10 ***nightwatch*** **October 2013**

What's Up? - Exploding Stars !

An exploding star is called a nova, meaning new in Latin. The Danish astronomer Tycho Brahe coined this term when he observed a new star in Cassiopeia that was brighter than Venus. This was in November 1572, an age before telescopes. He published his observations (De Nova Stella) and was rewarded by the King with an new observatory. Since the star suddenly appeared then faded, Tycho theorized that it had exploded. How often did these exploding novae appear? When Tycho died (perhaps from overeating) the astronomer who inherited his studies, Johannes Kepler, saw another Venus-bright Nova in Ophiuchus during August 1604. Was this a common occurrence? Actually both these dazzling explosions were naked-eye supernova but none have been seen since 1604. Although they can be found in other galaxies. The more common occurrence is a nova.

This year, on my birthday August 14th, a naked-eye nova appeared in Delphinus (Dolphin). It had been 17th magnitude (more than a 1,000 light years away) and in a few days it grew to 3rd magnitude then faded away. It was discovered by Koichi Itagaki in Japan and in a two days brightened 100,000 times. In 1967 a Delphinus nova flared up close to this recent one.

These common nova occur in a tightly-orbiting binary star system where a normal star pours a stream of hydrogen onto the surface of a companion white dwarf. When this layer of hydrogen grows thick enough its bottom layer explodes in a runaway hydrogen-bomb type fusion reaction. This outburst might destroy the star system or it can repeat itself again after another build up. Then it can be called a recurrent nova.

Recurrent novae may erupt every couple of decades, so their explosions can be predicted to some extent. The early outburst activity can be studied more than the common novae which can be seen to erupt only once. Their unexpected explosions destroying any evidence of their origin.

In the rarer supernova scenario, a giant star, far more massive than our sun is nearing the end of its life. Having grown unstable it suddenly blows itself apart with the brilliance of 100 billion normal stars. Giant stars are few and far between (the most common are red dwarf stars). There aren't any giant stars or unstable binary systems closer to our Sun than 20 light years (considered a safe distance). Any nova closer than 20 light years could bathe our system in dangerous levels of radiation.

All known supernovae in our galaxy (located by their remnants) are thousands even tens of thousands of light years away. This is an indication of their rarity, since they involve uncommonly gigantic stars.

These supernovae involve so much star material that their remnants remain behind thousands of years after their explosions. There is not a lot of visible light but a images in infrared light, X-ray, and others type of radiation can now be studied.

Since there are thousands of other galaxies, supernovae explosions are readily discovered there for those (often amateurs) who have time to hunt at random. Remnants that far away are too distant to be seen although they can be observed in close dwarf galaxies like the Large and Small Magellanic Clouds. Supernova remnants in our own Milky Way Galaxy are rare and distant.

The most analyzed nova remnants are known by a date and location within human history when they appeared and were recorded by observers. These include the remnants of the brightest (it must have been huge) supernovae remnant, the Crab Nebula (M1) recorded by the Chinese in 1054. Although it must have been brighter than Venus no Europeans saw it. Tycho Brahe's originally "nova" of 1572 (pictured) has a dim mostly non-visual light remnant. This is also true of Kepler's 1604 nova.

Club Events Calendar

October 18 - General meeting

November 2 - Star Party - Anza-Borrego St Park Parking Lot
November 7 - Board Meeting, 6:15
November 15 - General meeting

December 7 - Holiday Party - Sizzlin' Skillets, 7:00pm
No scheduled Star Party
December 12 - Board Meeting, 6:15

PVAA Officers and Board

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President ….....	Mathew Wedel	909-767-9851
Vice President ..	Joe Hillberg	909/949-3650
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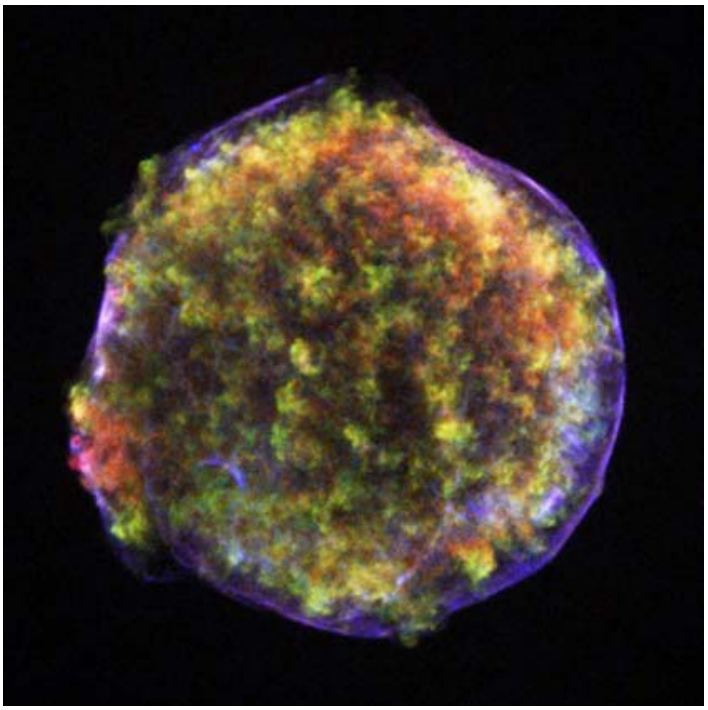
Exploding Stars continued

A mysterious nova remnant is Cassiopeia A, originally discovered as a powerful radio source now known to emanate from a neutron star at its core. Although Cassiopeia A exploded about 1680 AD no one recorded having seen it. This may be because some novae are dimmed by a light obscuring cloud of cast off material.



Several extremely ancient supernovae remnants can be observed as scattered whispy fragments, such as the Veil Nebula in Cygnus and another in the constellation of Vela. These explosions must have been gigantic to leave remants behind for so long. Some possible future supernovae are Betelgeuse and Eta Carina but they probably won't explode for millions of years. Since 1604 astronomers have waited for a Venus-bright supernova.

Lee Collins

General Meeting 09/20/13

In the announcements the Claremont Library Telescope is doing well, and the Outreach Star Party at the main Ontario Public Library has about 295 people view Saturn, Venus and the moon through 3 telescopes. RTMC (Riverside Telescope Makers Conference) needs volunteers and a Board member. If you are interested please contact the Riverside Astronomical Society. (RAS) www.rivastro.org

Alex McConahay former president of RAS gave 3 mini-presentations. The first was on his visit to the Ice Palace at Fairbanks, Alaska. There he witnessed the "Northern Lights" also known as the Aurora Borealis. He took several pictures from 2 – 8 seconds with an ISO of 800 – 1600 at F2. No need for a telescope for this, as it goes from horizon to horizon. Bring a good coat as it was -20 degrees Fahrenheit. The best time to catch the auroras is February and March. (Non-moon nights.) A good video on You-Tube is:

www.youtube.com/watch?v=YYoufgetUuQ

He showed pictures of the Ice Palace with its uniqueness. He suggests that everyone take a trip up north at least once in their life to see the wonder and majesty of the Northern Lights.

Alex's second presentation was titled "What's Up And How Do We Know That?" He talked about Pluto – 30 to 49 AU (4.4–7.4 billion km) from the sun.

[1 AU = the average distance of the Earth from the sun] It's mass is 1.27e22 Kg, diameter = 2274 km, average temp = 43K (Kelvin) or -382 degrees Fahrenheit. It has a thin atmosphere of nitrogen, carbon dioxide and methane. Astronomers were able to ascertain those facts using a spectrograph, the Doppler shift, and parallax along with Kepler's 3rd law. We know of 5 moons that orbit Pluto. Currently the NASA spacecraft "New Horizons" is on its way to Pluto. It should pass by Pluto on July 14, 2015. (As long as it doesn't run into an unknown moon of Pluto or a rogue asteroid.)

Alex's last presentation was of completing the Messier Marathon. In one night he photographed all 110 objects in the Messier catalog. That meant that he only had approximately 5 minutes to find and center the next object, photograph it, and have the telescope slew to the next object. What this takes is good planning and PRACTICE. You should check out his website at: www.alexastro.com.

Two other websites Alex suggested are:

www.Calsky.com and
heavens-above.com.

Gary Thompson