July 2009

Volume 23 Issue 7

The Observer

East Valley Astronomy Club

Inside this Issue:

From the Desk of the President
by David Douglass

The summer of 2009 is offering us an interesting challenge. My memory of June is normally of a very dry, and cloud free season, with many opportunities for late evening observing. So far, that has not been the case. And when the weather forecast is for clear skies, AND the CSC is showing favorable conditions, you still have to be concerned, due to "local conditions". For the past many years, the Grand Canyon Star Party has been in June, and offered clear skies for thousands of viewers. This year, the volunteers manning their telescopes at the National Park had to work hard to find small openings in the skies on most nights. But, reports that I have heard seem to indicate they all had a good time.

As we move into July, many of us will start looking for cooler, and higher places to observe from. Maybe now would be a good time to remind everyone of a few simple "safety rules". If you are heading out, it is always a good idea to have someone else with you. It is also a good idea to let others not traveling with you, where you intend on going, and when you are expected back. Most importantly, remember to stay informed on local weather conditions.

Our July meeting promises to be another good one. Wayne Thomas, our Vice-President, has done an excellent job of lining up excellent speakers. Paul Scowen of Arizona State University, will be speaking on "The Star Formation Camera". Messier 51, the Whirlpool Galaxy, has long been one of my favorites to observe and image. I look forward to this presentation. We also will have Chuck Dugan from Kitt Peak/NOAO to make a short presentation on Project Astro, which is an educational

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The Backyard Astronomer
Bad Feng Shui at North Rim *by Bill Dellinges*

I attended the first five nights of the Grand Canyon Star Party at the North Rim. For those of you in a hurry, I can state the following: 1) I was the only EVAC member there. 2) Until Jim Mahon from California arrived with his 4" Televue refractor, my C-8 was the smallest telescope on the scene amongst a forest of large Dobsonians. 3) The weather was the worst I've seen in my previous 10 visits there.

For those of you with a little more time on your hands, allow me to elaborate further on my North Rim experience, which, I'm happy to say, was an improvement over my last star party there – not withstanding the dismal weather. Readers of this column may recall I was so disgruntled with the 2007 North Rim situation that last year I avoided the star party altogether by going there in May (See July 2007 and 2008 articles).

I'm very pleased to report that things have improved considerably under the auspices of coordinator Steve Dodder of the Saguaro Astronomy Club. The fire lane through our limited setup area has been eliminated and two troublesome lights have been replaced with red bulbs. One of two nearby cabin porch lights that has irritated us in the past now has a yellow light bulb. The other cabin is being considered for conversion also. Why not red? We can only push so much. The park places safety above our needs and it's felt red porch lights won't adequately illuminate the porches at night. While we gazers might not totally agree with that, we don't want to bite the hand that feeds us. After all,

Continued on page 2

Upcoming Events:

Public Star Party – July 10

Monthly General Meeting – July 17

Local Star Party – July 18

Deep Sky Star Party – July 25

Check out all of the upcoming club events in the Calendars on page 8

The Backyard Astronomer

Continued from page 1 the Park has been very generous in allowing us to descend upon them each year with our battery of "cannons."

The weather was not kind to us this year. The first night had one hour of clear skies; the second night, two hours. Nights three and four were completely clouded out. Finally, on my last night, it was clear from dusk to well after midnight even though the day saw thunder, lightning and showers. We rejoiced.

GCSPNR Coordinators Steve & Rosie Dodder with their 20" Obsession

I saw more telescopes at the GCSPNR than ever before. Most nights saw 12 telescopes set up. SAC's president, Richard Harshaw, had a C-11 on a CI700 mount. SAC vice-president, Chris Hanrahan, brought an Orion 12" Dob. SAC's Steve and Rosie Dodder muscled the biggest scope, a 20" Dob, onto the veranda, and Rich Walker, another SAC member, manned a 13" Dob. "L.A. Bob" had a 15" Discovery Dob. Jim Mahon offered wide field views through his 4" Genesis and "John" ranged the heavens with a CGE-11. There was a new Meade Lightswitch set up but the owner was new to astronomy so we didn't see it in action very much. By far the most unusual telescope there was a 9" folded refractor built by "Richard" of northern California. It was a beautifully machined, all metal affair sporting an eye-catching purple paint job. The scope was a GOTO and tracked. It incorporated three mirrors to fold the F-15 optical path into a package only one yard long. In the heat of battle, I had only one quick look through it at Saturn at 100x and regret I didn't get a chance to spend more time looking through it.

John and his folded refractor

I couldn't help but notice one fellow's 8" Meade 2080 SCT with three closely placed cracks in the corrector plate running from the secondary to the outer edge of the plate. Unfortunately, I never got a chance to look through it to see how the cracked glass might have affected its performance.

When we did have clear skies, we were swamped by the public. A number of people told me it was the first time they looked through a telescope. There's a special satisfying feeling in giving someone their first view of the universe. Throughout the night, gasps of amazement rang out at the image of Saturn, even with the rings edgewise this year. They still went nuts over it, "Oh my God, is that for real?!" Trying to pull the scope away from Saturn was tougher than trying to kill Rasputin.

Supernovae Types, Part One

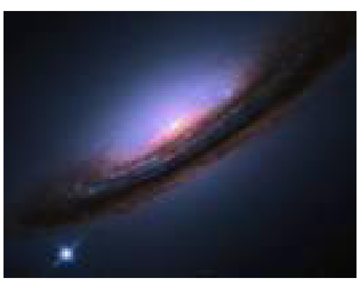
by Henry De Jonge IV

It has often been a bit perplexing to me about the plethora of SN types and their names. In the following two articles we will look briefly at supernovae, (SN). In this first installment we will look at SN in general and examine SNIa. In the second installment we will examine SN called Type Ib, Ic, & Type II.

SN were noticed by the ancients all over the world as new and unusual, temporary stars that could even be seen brightly during the day, often for long periods of time. The most famous ancient SN was in 1054 and is now known as the Crab Nebula, (Type II SN). It was recorded by the Chinese and Native Americans and no doubt many others.

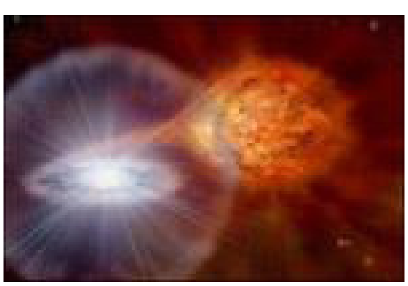
SN are not to be confused with nova, (novae) which are the result of a cataclysmic variable star undergoing an unexpected outburst, usually a white dwarf in a binary system. However these smaller nuclear explosions do not consume the star and are thousands to millions of times less energetic than a normal SN.

The classification of SN types was begun in the 1940's with Minkowski long before the physical details of their origins was understood. It was based upon their visual light spectra at maximum light, (apparent magnitude graphed Vs time). The primary division was based upon the lack of or abundance of H in the spectra. If it contained a line of H in the spectra, (from the Balmer series) it was classified as a Type II SN, otherwise it was called a Type I SN. The presence or absence of other elements and the shape of the light curves gives rise to the sub groups, however the classification of SN types does not reflect their physical origins as we shall see, thus the confusion. SN are named by the year they are discovered and followed by a letter, (or letters if over 26 are noted in a year) in alphabetical order. For example the SNIa shown below was named SN 1994D Ia.



SN type I are defined by their lack of hydrogen in the spectra. It is generally believed that they form from close binary star systems via mass transfer when one star, an earth sized white dwarf, (usually formed by stars with about 0.4 to 4 solar masses and can be very old) composed mainly of carbon and oxygen, accretes enough matter from its companion, (usually a main sequence star) to send it over the Chandrasekhar limit, (about 1.4 solar masses) and cause a runaway, massive, nuclear explosion, a fusion of carbon and oxygen.

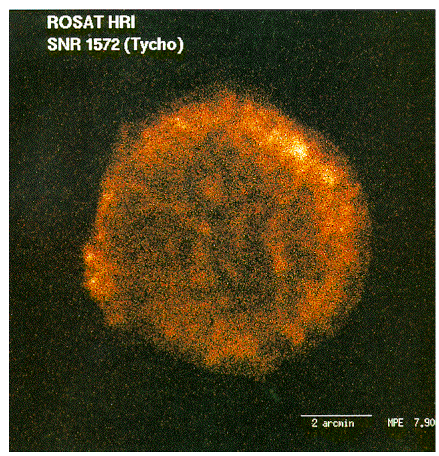
Here a red giant gives up mass to a white dwarf which turns into a SNIa



As a result of this huge influx of added mass its radius decreases, its density increases, and its temperature increases. Above this Chandrasekhar mass limit the electrons in the atoms of the white dwarf can no longer support the stellar remnant mass and it continues to collapse until the temperature and density are so high that it allows carbon fusion to take place. This runaway carbon nuclear fusion occurs very quickly, (in seconds) and generates oxygen, magnesium, neon, and other elements releasing enough energy to blow the "star" apart at a small percentage of the speed of light. There are typically no neutrinos blasted from this type of SN and they have a slightly less overall energy output when compared to core collapse type II SN, (as we shall look at more closely in the next installment). However the energy released in these types of explosions is equivalent to what the sun releases in its entire lifetime.

By the time a star becomes a white dwarf it usually has no remaining hydrogen left and thus the lack of hydrogen in the spectra. Since the remnant consists of carbon and oxygen, the relatively small amount of hydrogen and helium accreted from the companion star is also compressed and fused by the strong white dwarf gravity into these same elements. The silicon lines come from the fusion of carbon and oxygen, while iron is also produced in abundance. These left over elements are ejected into the (interstellar medium) ISM and this is probably where the iron, etc in our own bodies comes from.

A SN remnant, (SNR) is defined as is whatever is left from a SN explosion, both the solid core remnant, (if any) and the gaseous remains. In the case of SNIa it refers only to the nebulous remains. They often have a filamentary and/or shell structure as seen from Earth and produce polarized radio synchrotron radiation. They are usually expanding rapidly and can achieve velocities of over 20,000 kps, although this obviously reduces over time as the energy is dissipated. Still they can cover light years in only a century or two. A good example of this is the Crab SNR which is over 13 light years across, and the Cygnus loop which is over 100 light years across. About a century after the explosion, (or about 1 light year away) the SNR usually collects enough interstellar material to begin slowing down the expansion quite dramatically and this can create a large shock region which also emits synchrotron radiation at radio wavelengths. Soon the velocity is low enough, (about 100 kps) that emission from heavier elements becomes noticeable, while the SNR carves out a hot, low density, cavity in the ISM. After a few hundred thousand years or so the SNR blends into the ISM and becomes part of the background. SNIa typically generate a SNR that are like a thin spherical shell in appearance and are brighter at their outer edges, (especially at X-ray and radio wavelengths) with H Balmer lines visibly seen.



Above we see the Tycho SNR, (type Ia) in X-rays.

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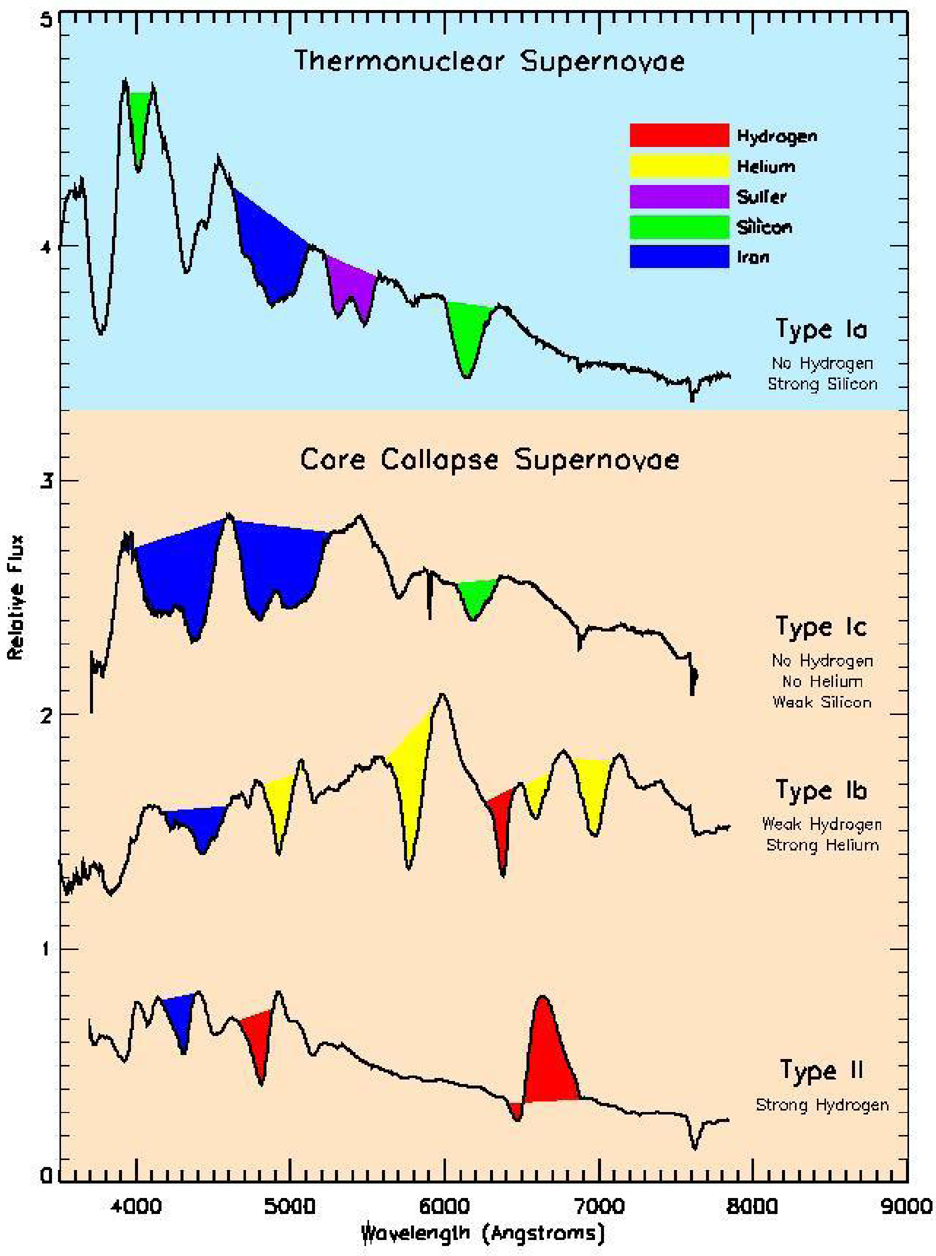
Supernovae Types

Continued from page 3

Over time, in an interesting vein of thought, it was noticed that SNIa produce a relatively stable and predictable light output thus making them suitable for use as standard candles in measuring distances. The relationship between absolute magnitude, apparent magnitude, and distance is calibrated, (from the LMC, SMC, and M31 using Cepheid variables) and the SNIa can then become gauges to help us determine vast cosmic distances. SNIa were used as standard candles a decade ago to reveal the unknown energy component of our Universe now called dark energy.

This use of SNIa as distance probe is fairly well mature today, however there is ongoing work to refine this distance method, understand better its limitations, and to calibrate it with respect to a wider range of redshift. Currently there are only a couple of dozen SNIa known above a redshift of 1, (about 7-8 Gly away) while there are hundreds of SNIa known with a redshift of less than 1. It is hoped that the upgraded HST will enable more of these longer range SN to be discovered, (to about a redshift of 1.5), while the JWT may be able to see SNIa out to a redshift of 3 or more. There is evidence that the SNIa at higher redshift have different light curves and spectral abundances, (for example more Fe and Ni) than those of lower redshift. Since the light curves are used for distance calibration, these differences will become important in furthering our understanding of dark energy and cosmic expansion. There is also more work to be done in calibrating SNIa with respect to intervening gas and dust. Is there is a difference in the intergalactic dust and the galactic dust, (at least as far the dust in the Milky Way is concerned)?

As noted earlier, type I SN are classified into sub groups known as Ia, Ib, and Ic. Type Ia are the type that can happen in any cosmic environment and are thought to occur as we have noted via accretion onto a white dwarf. Types Ib and Ic however are exploding massive stars like type II SN, which have shed their outer layer of hydrogen before exploding and are typically associated with regions of relatively new star formation. Type Ib have no Si lines in their spectra and are a bit fainter than type Ia. They also have He lines and this is thought to be the result of He detonation on a carbon/oxygen core. They are massive stars that have lost their outer H layer and then show off their He layer that resided below. However if a massive star has blown most of its outer hydrogen off by the time it explodes which would make it a Type II SN in theory, then its spectra will also show a lack of hydrogen. Thus we can see how the historical spectral classification of SN does not follow a strictly logical format. Type Ic have no He lines and no Si lines at maximum light and are usually more massive than type Ib SN stars, which have gone through more mass loss and shed off both their H and He outer layers exposing the carbon rich layers below.



Above is a picture of the various types of spectral light curves for SN and indicating their relative abundances and depletions in the spectral lines.

The time between the birth of a binary system and the SNIa explosion is called the delay time of the SN. Different SNIa progenitors will give rise to different delay times and a useful calculation is the distribution of the delay times or DTD. This DTD helps determine the rate of injection of energy and nuclear byproducts from the SNIa into the ISM. This is important in the evolution of galaxies and the formation of the intergalactic and intra cluster medium such as in their chemical evolution. There is also a direct relation of the DTD to the star formation history of stellar systems in a "local" stellar environment.

The younger stellar systems in an environment raise the probability for a SNIa and there is recent evidence that *Continued on page 13*

July Guest Speaker: Paul Scowen

Dr. Paul Scowen, Astrophysics Research Professional in the School of Earth and Space Exploration at ASU, will be our guest speaker at the July meeting.

Dr. Scowen's research interests include the interplay between massive stars and star formation in the surrounding environment; collaborative development of space mission concepts and missions to survey star formation in both the near and far universe in an attempt to understand the critical quantities and factors that affect the formation and evolution of stars and planetary systems in massive star-forming environments; and the physics of the relativistic particle wind from the Crab Nebula pulsar, and the interaction of the wind with the extended remnant.

Paul's talk will be on the Star Formation Camera, a wide-field (~19'x15', ≥280 arcmin^{2}), high-resolution (0.018"x0.018" pixels), mid-UV-near-IR (190-1075 nm) dichroic camera. The SFC will deliver diffraction-limited images at $\lambda \geq 300$ nm in both a Blue (190-517 nm) and a Red (517-1075 nm) channel simultaneously.

Basic Astronomy Four Part Lecture Series to Begin in September

Howard Israel will be presenting a four part lecture series beginning at the September 2009 EVAC meeting. The Lecture Series will be presented in four separate (monthly) sessions, each beginning at 6:10 PM, lasting for one hour, followed by a break, and then the regular EVAC meeting will begin at 7:30 PM.

Following is a brief outline of the topics that will be covered during the lecture series:

- The terms of astronomy – words you need to know
- Star gazing basics
- Learning the sky – planets, constellations, stars, deep sky objects
- Visual observing – How to see the wonders of the heavens with your own eyes
- How to use a Planisphere
- How to read a star map
- Secrets of deep sky observing
- Where to get free astronomy software
- Choosing a pair of binoculars
- Choosing your first telescope
- Light pollution – what you can do about it

Session 1 (Sep 18th) covers general basic astronomical terms, (Ascension, declination, etc)
Session 2 (Oct 23rd) covers the Solar System and how to observe planets.
Session 3 (Nov 20th) covers deep sky observing
Session 4 (Jan 15th) covers binoculars, telescopes, eyepieces, etc.

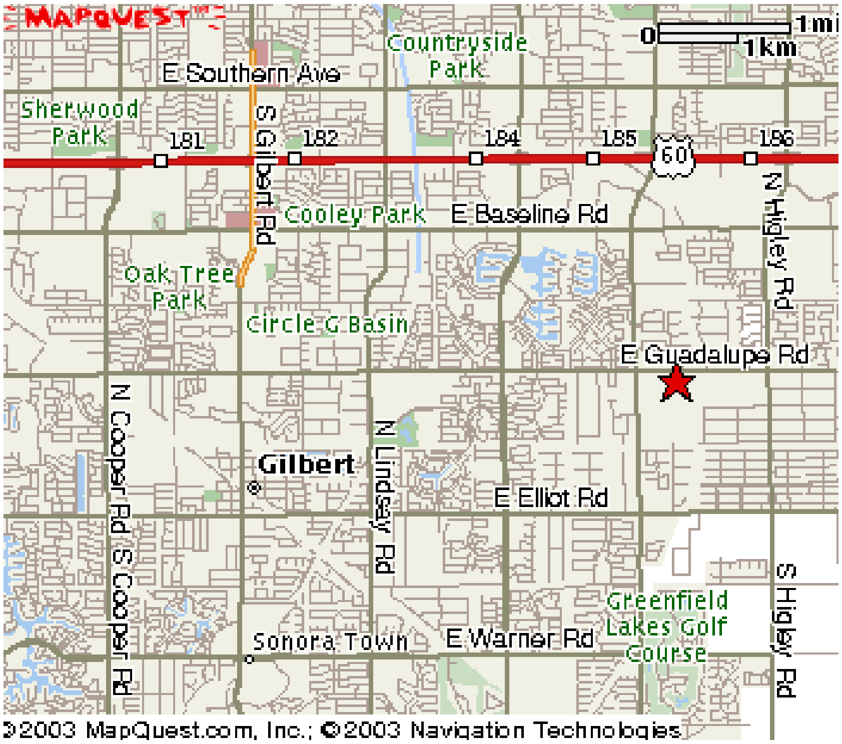
Full Moon on July 7 at 02:22

Last Quarter Moon on July 15 at 02:54

New Moon on July 21 at 19:35

First Quarter Moon on July 28 at 15:00


Combined Operational Load Bearing External Resistance Treadmill
C.O.L.B.E.R.T.

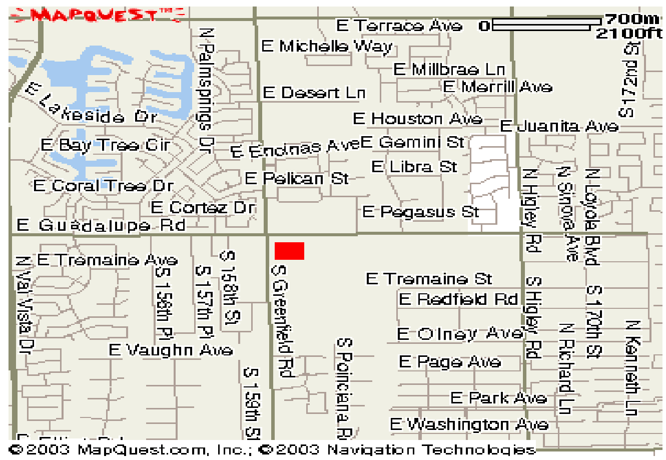


The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads.

Meetings begin at 7:30 pm.

Visitors are always welcome!



Upcoming Meetings

July 17

August 21

September 18

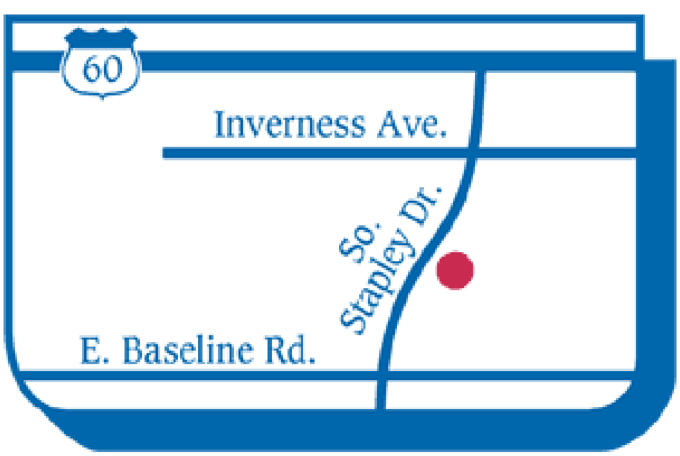
October 23

November 21

December 19

Southeast Regional Library
775 N. Greenfield Road
Gilbert, Az. 85234

All are welcome to attend the pre-meeting dinner at 5:30 pm. We meet at Old Country Buffet, located at 1855 S. Stapley Drive in Mesa. The restaurant is in the plaza on the northeast corner of Stapley and Baseline Roads, just south of US60.



Old Country Buffet
1855 S. Stapley Drive
Mesa, Az. 85204

Likewise, all are invited to meet for coffee and more astro talk after the meeting at Denny's on Cooper (Stapley), between Baseline and Guadalupe Roads.

Denny's
1368 N. Cooper
Gilbert, Az. 85233

July 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	**10**	11
12	13	14	15	16	**17**	**18**
19	20	21	22	23	**24**	**25**
26	27	28	29	30	31	

July 10 - Public Star Party at Riparian Preserve in Gilbert

July 17 - General Meeting at SE Regional Library in Gilbert

July 18 - Local Star Party at Boyce Thompson Arboretum

July 24 - Chandler Environmental Center Star Party

July 25 - Deep Sky Star Party at Vekol

August 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	**14**	**15**
16	17	18	19	**20**	**21**	**22**
23	24	25	26	27	28	29
30	31					

August 1 - Mt. Graham Tour

August 14 - Public Star Party at Riparian Preserve in Gilbert

August 15 - Local Star Party at Boyce Thompson Arboretum

August 20 - Julian Starfest

August 21 - General Meeting at Southeast Regional Library in Gilbert

August 22 - Deep Sky Star Party at Vekol Road

East Valley Astronomy Club -- 2009 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

IMPORTANT: All memberships expire on December 31 of each year.

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

New Member Dues (dues are prorated, select according to the month you are joining the club):

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$37.50 Individual** October through December

☐ **$43.75 Family** October through December

Includes dues for the following year

Renewal (current members only):

☐ **$30.00 Individual** ☐ **$35.00 Family**

Magazine Subscriptions (include renewal notices):

☐ **$34.00** Astronomy ☐ **$33.00** Sky & Telescope

Name Badges:

☐ **$10.00** Each (including postage) Quantity: ______

Name to imprint: ______________________________

Total amount enclosed: [ ]

Please make check or money order payable to EVAC

☐ Payment was remitted separately using PayPal ☐ Payment was remitted separately using my financial institution's online bill payment feature

Name: [ ] Phone: [ ]

Address: [ ] Email: [ ]

☐ Publish email address on website

City, State, Zip: [ ] URL: [ ]

How would you like to receive your monthly newsletter? (choose one option):

☐ Electronic delivery (PDF) *Included with membership* ☐ US Mail **Please add $10 to the total payment**

Areas of Interest (check all that apply):

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

Please describe your astronomy equipment:

Would you be interested in attending a beginner's workshop? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club? [ ]

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC") I hereby affirm that I and my family agree to hold EVAC harmless from any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), which may directly or indirectly be connected to EVAC and/or my presence on the premises of any EVAC Star Party and related areas.

I further agree to indemnify any party indicated above should such party suffer any claims, liabilities, losses, demands, causes of action, suits and expenses (including attorney fees), caused directly or indirectly by my negligent or intentional acts, or failure to act, or if such acts or failures to act are directly or indirectly caused by any person in my family or associates while participating in an EVAC Star Party.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance.

EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Please print name here

Date

Please sign name here

PO Box 2202
Mesa, AZ 85214-2202
www.eastvalleyastronomy.org

The Cool Chemistry of Alien Life

Alien life on distant worlds. What would it be like? For millennia people could only wonder, but now NASA's Spitzer Space Telescope is producing some hard data. It turns out that life around certain kinds of stars would likely be very different from life as we know it.

Using Spitzer, astronomers have discovered the organic chemical acetylene in the planet-forming discs surrounding 17 M-dwarf stars. It's the first time any chemical has been detected around one of these small, cool stars. However, scientists are more intrigued by what was not there: a chemical called hydrogen cyanide (HCN), an important building block for life as we know it.

"The fact that we do not detect hydrogen cyanide around cool stars suggests that that prebiotic chemistry may unfold differently on planets orbiting cool stars," says Ilaria Pascucci, lead scientist for the Spitzer observations and an astrophysicist at Johns Hopkins University in Baltimore, Maryland.

That's because HCN is the basic component for making adenine, one of the four information-carrying chemicals in DNA. All known life on Earth is based on DNA, but without adenine available, life in a dwarf-star solar system would have to make do without it. "You cannot make adenine in another way," Pascucci explains. "You need hydrogen cyanide."

Do alien planets around other stars have the right ingredients for a pre-biotic soup?

M-dwarf and brown dwarf stars emit far less ultraviolet light than larger, hotter stars such as our sun. Pascucci thinks this difference could explain the lack of HCN around dwarf stars. For HCN to form, molecules of nitrogen must first be split into individual nitrogen atoms. But the triple bond holding molecular nitrogen together is very strong. High-energy ultraviolet photons can break this bond, but the lower-energy photons from M-dwarf stars cannot.

"Other nitrogen-bearing molecules are going to be affected by this same chemistry," Pascucci says, possibly including the precursors to amino acids and thus proteins.

To search for HCN, Pascucci's team looked at data from Spitzer, which observes the universe at infrared wavelengths. Planet-forming discs around M-dwarf stars have very faint infrared emissions, but Spitzer is sensitive enough to detect them.

HCN's distinctive 14-micron emission band was absent in the infrared spectra of the M-dwarf stars, but Spitzer did detect HCN in the spectra of 44 hotter, sun-like stars.

Infrared astronomy will be a powerful tool for studying other prebiotic chemicals in planet-forming discs, says Pascucci, and the Spitzer Space Telescope is at the forefront of the field. Spitzer can't yet draw us a picture of alien life forms, but it's beginning to tell us what they could—and could not—be made of. "That's pretty wonderful, too," says Pascucci.

For news of other discoveries based on Spitzer data, visit www.spitzer.caltech.edu. Kids can learn Spitzer astronomy words and concepts by playing the Spitzer "Sign Here!" game at spaceplace.nasa.gov/en/kids/spitzer/signs.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

If It's Clear...
by Fulton Wright, Jr.
Prescott Astronomy Club

JULY 2009

On Wednesday, July 1, from dusk (about 8:45 PM) till Saturn sets (11:25 PM) you have your 9th and next-to-last chance to see Titan's shadow on the planet. Catch it early before the planet gets too low.

On Friday, July 3, in the evening, you can watch the Moon sneak up on the bright star, Antares. Unfortunately, by the time the Moon moves in front of the star, the duo have set.

On Monday, July 6, at 12:49 AM, you can watch Io partially occult Europa. If you start watching Jupiter about 15 minutes before the event, you can see the two satellites merge, then separate.

On Monday, July 6, at 7:36 PM (10 minutes before sunset) the full Moon rises, spoiling any deep sky observing for the whole night. Later in the night (about 2:20 AM, Tuesday) the Moon will barely touch the peneumbra of the Earth. The dimming should be unobservably small. If you look at the Moon at this time, check out the limb opposite the shadow, near Tycho (the bright crater with all the rays) to see if you can see any shadows due to craters or mountains.

On Friday, July 10, about 11:00 PM, you can see an interesting alignment of objects. Jupiter (magnitude -3), Mu Capricorni (magnitude 5), and Neptune (magnitude 8) are all in a line to the upper left, about half a degree long. Three of Jupiter's moons (all about magnitude 5), Europa, Ganymede, and Callisto, are lined up at right angles. Jupiter's fourth bright moon, Io, is in front of the planet and its shadow is on Jupiter. Six degrees to the left, the gibbous Moon lurks.

On Monday, July 13, from 12:16 AM to 12:40 PM, you can watch the Moon hide magnitude 4.5 Lambda Piscium. Use a telescope, the bigger the better, and high power to see the disappearance on the bright limb of the Moon. The reappearance on the dark limb will be easier to observe. This event happens near the Moon's south pole, so an observer south of Prescott, AZ might see the Moon miss the star.

On Tuesday, July 14, at 11:30 PM, the third quarter Moon rises, cutting off your deep sky observing for the rest of the night.

On Friday, July 17, from dusk (about 8:45 PM) till Saturn sets (10:25 PM) you have your 10th and last (that's L A S T) chance to see Titan's shadow on Saturn for the next 15 years. This difficult observation will be made even harder by Saturn's low altitude.

On Sunday, July 19, about 3:45 AM you can see an interesting alignment of objects, all 5 to 7 degrees apart. Start low in the east-southeast with Elnath (Beta Tauri, magnitude 2). To the right is the thin crescent Moon (magnitude -5), Venus (magnitude -4), and Aldebaran (Alpha Tauri, magnitude 1). Now turn upward for Mars (magnitude 1) and the Pleiades (magnitude 1.5).

On Tuesday, July 21, it is new Moon, giving you the whole night to look for faint fuzzies. Some lucky people in China or on the Pacific Ocean might be watching a total Solar eclipse.

On Wednesday, July 22, from 10:13 PM till 3:03 AM the next morning, you can catch Callisto's shadow on Jupiter.

On Tuesday, July 28, the first quarter Moon lights up the sky till 11:28 PM.

Shamelessly stolen information from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find info. When gauging distances, remember that the Moon is 1/2 a degree or 30 arc-minutes in diameter. All times are Mountain Standard Time.

From the Desk of the President

Continued from page 1

program to pair up astronomers and school teachers to enable classroom presentation on astronomy.

At our September meeting, we will begin a four part series (covering four months) on "Basic Astronomy". This lecture series will start at 6:10 PM, and last for one hour, followed by a break, and then the regular meeting will begin as usual at 7:30 PM. There is a separate article on this subject. Please be sure to read it. Based upon a show of hands at the June meeting, there is a large interest in this, and many people are planning on attending. I hope to see you there.

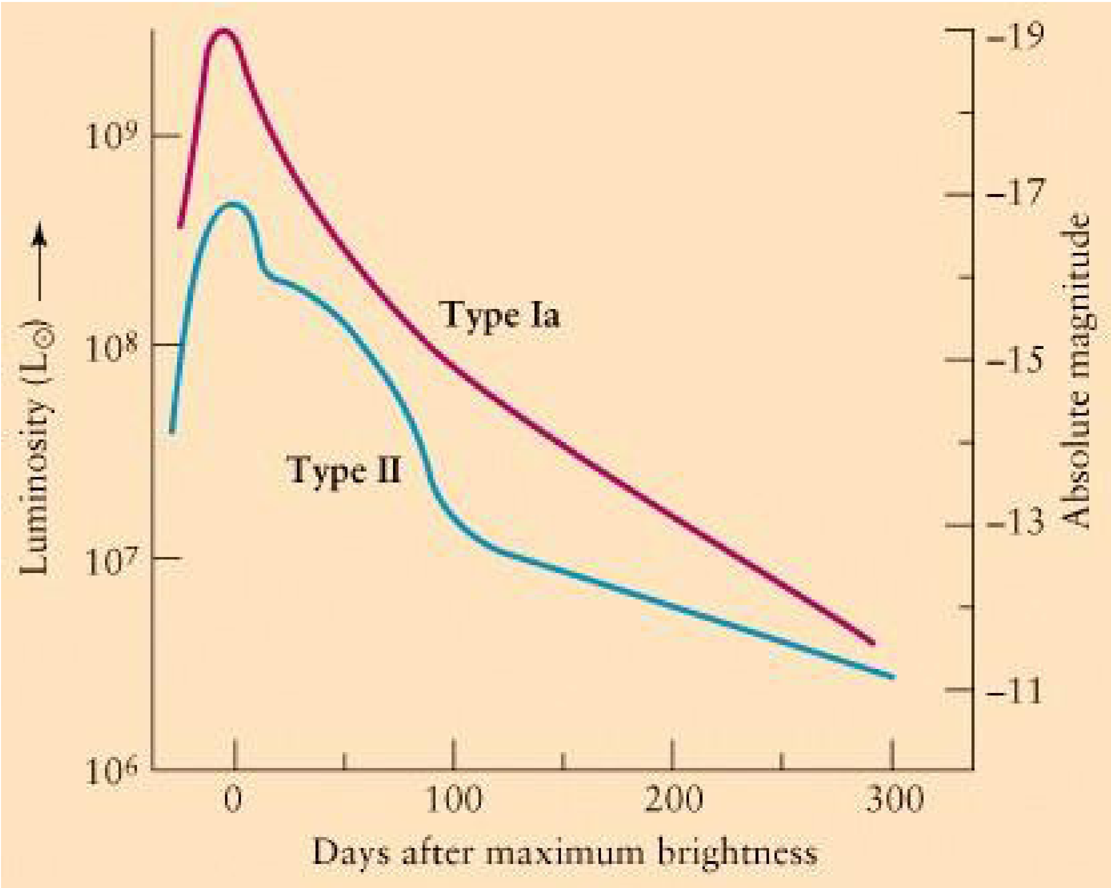
Our meetings have always been on the 3rd Friday of the month. However, this October will be an exception. The reason is the All Arizona Star Party (which we host and sponsor), which is scheduled for the weekend closest to the New Moon. This October, New Moon is on the 18th, which means the AASP will be Oct 16-17, which includes the 3rd Friday. The October regular meeting has been scheduled for Oct 23rd, which is the 4th Friday. Please mark your calendars.

If I don't see you out in the observing areas, then I look forward to seeing you at the July meeting. Until then, Keep Looking Up!

Telescope veranda at Grand Canyon Star Party - North Rim

Continued from page 4 radio loud ellipticals may have an enhanced SNIa rate. Typically a major fraction of the SNIa occur in a few hundred million years after star formation although many also arise in older stellar populations of at least several billion years. The light curves of these two types are slightly different with the younger population being a bit brighter on average. In a typical galaxy like the Milky Way there are about ten SN events per century with an estimated several hundred thousand already taken place. In galaxy studies there is more work being done today that is attempting to correlate the morphological type of galaxy with the SNIa rate.

While we know much about the light curves and spectra of SN I types and understand their most likely causes, the final path to the SNIa explosion is still not fully understood. The usual model of SNIa is that of a white dwarf accreting mass from a companion that we have discussed, this is called the single degenerate model, while another model of SNIa called the double degenerate model, is where two white dwarfs combine to exceed the Chandrasekhar limit and merge causing the explosion. The two different models we discussed to explain the origins of SNIa will each have different delay times so that by just knowing the DTD we may be able to shed light on the more predominant model. It is thought that by studying the ejecta of the SNIa explosions and their spectra that this may also lead to a better understanding of the progenitors, as it is rare to actually image the progenitor in pre explosion images. Also the recently discovered technique of light echo spectral analysis combined with remnant optical images can provide some evidence on the progenitor.



Above is a comparison of the light curves from a SNIa and a Type II SN.

In conclusion we see that SNIa are critical in helping to determine cosmic distances and study dark energy, they influence the evolution of galaxies, star formation, and the ISM, while being an excellent example of still many unknown experiments in extreme physics. There is still much work to do in completely understanding all the origins of SNIa, why their light curves change in all aspects, (for example as a function of metallicity or age), do they evolve with redshift, and their complete role in forming galactic chemicals and the ISM. There is hope that with the expected abundance of thousands of more SNIa being detected in the coming decades that the answers to these questions will be closer at hand.

New EVAC Members in June

Jim Bechtel - Gilbert

Ron & Jan Barstad - Tempe

John Huppenthal - Tempe

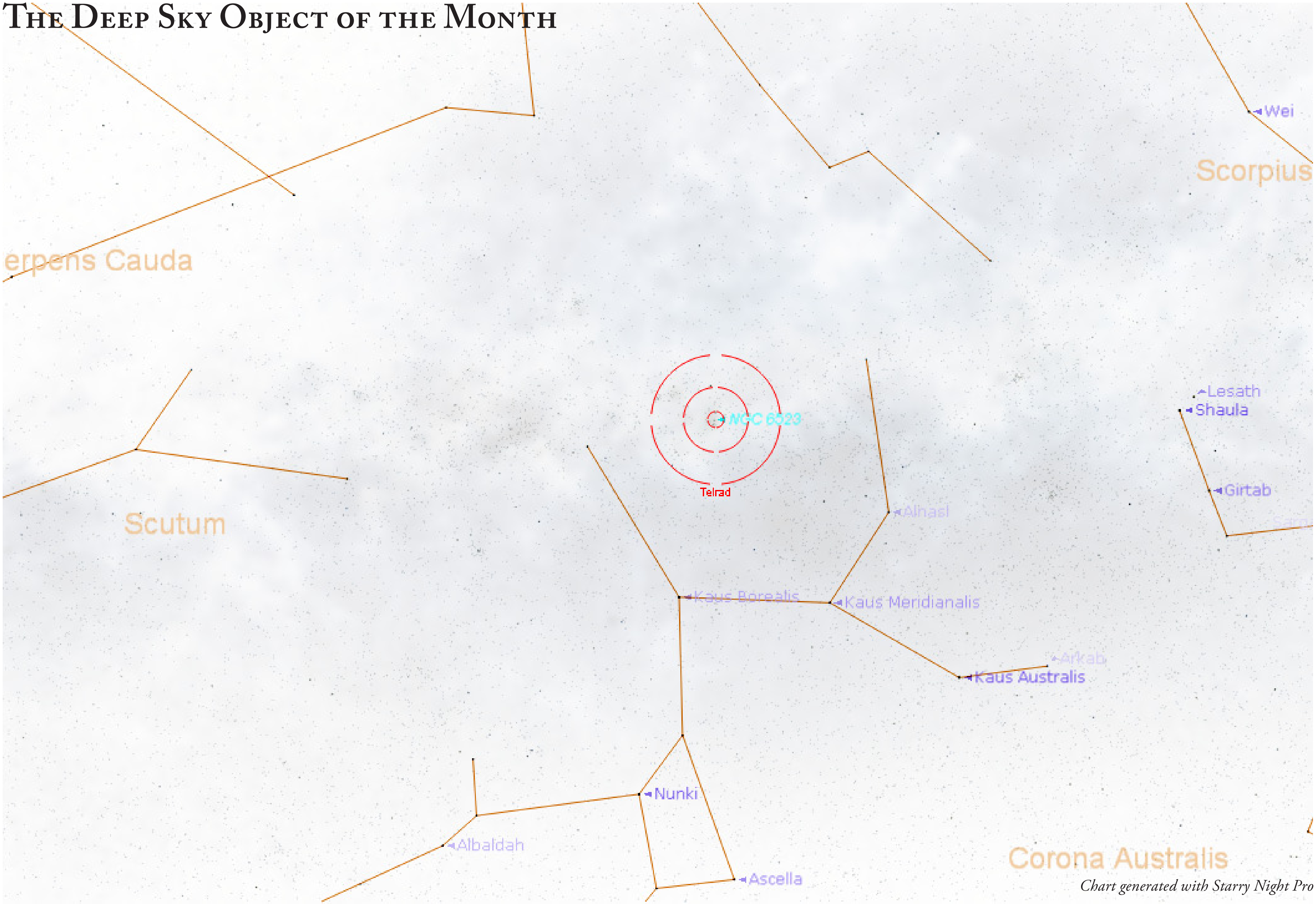


Chart generated with Starry Night Pro

NGC 6523 (M8, Lagoon Nebula) Diffuse Nebula in Sagittarius

RA 18h 04m 02.0s DEC -24° 23' 14" Magnitude: 5.0 Size: 17.0' x 15.0'

Fake Astronaut Gets Hit by Artificial Solar Flare

by Dr. Tony Phillips

In 1972, Apollo astronauts narrowly escaped a potential catastrophe. On August 2nd of that year, a large and angry sunspot appeared and began to erupt, over and over again for more than a week, producing a record-setting fusillade of solar proton radiation. Only pure luck saved the day. The eruptions took place during the gap between Apollo 16 and 17 missions, so astronauts missed the storm. Researchers still wonder, what would have happened if the timing had been just a little different, what if astronauts had been caught unprotected on the surface of the Moon?

NASA needs to know. The agency is in high gear preparing to send people to the Moon to set up a manned outpost, a step toward eventually sending humans to Mars or elsewhere in the solar system. These missions will take astronauts outside the protection of Earth's magnetic field for months or even years at a time, and NASA must know how to keep its explorers safe from extreme solar storms. So scientists are creating an artificial solar radiation storm right here on Earth. And they're testing its effects on an artificial human: Matroshka, the Phantom Torso.

Matroshka in and out of his white traveling poncho.

The European Space Agency's Matroshka and his NASA counterpart Fred have already flown in experiments aboard the Space Shuttle and the International Space Station that have shown how other kinds of space radiation such as cosmic rays penetrate the human body. Now, scientists at Brookhaven National Laboratory in Upton, New York, are subjecting an artificial torso to a beam of protons to learn how astronauts would be affected by the 1972 event. "We want to know how close it comes to a dangerously acute exposure," says Francis Cucinotta, the Chief Scientist for NASA's Radiation Program at the Johnson Space Center in Houston, Texas. In the parlance of radiation experts, "acute exposure" is brief but intense. Radiation strikes the body over a relatively short period of time ranging from minutes to hours—just like a solar flare. This is different from the "chronic exposure" astronauts normally experience as they travel through space. Cosmic rays hit their bodies in a slow drizzle spread out over weeks or months. With chronic exposure, the body has time to repair or replace damaged cells as it goes along, but an acute exposure gives the body little time to cope with the damage. "The biological effects are very sensitive to the dose rate," Cucinotta explains. "A dose of radiation delivered over a short amount of time is two to three times more damaging than the same dose over a few days."

At first glance, the 1972 event would seem to fall into the acute category—it was after all a solar flare. But there's a problem. It was actually a series of flares producing a radiation storm that was longer and less impulsive than normal. Radiation exposure would have been neither chronic nor clearly acute, but somewhere in between. In this gray area, details about how much of the radiation actually reaches a person's vital organs — versus how much is blocked by their spacesuit, skin and muscles — can make all the difference. Matroshka is helping scientists understand these details. He's a life-size plastic replica of a human torso, sans arms and legs. The plastic closely matches the density of organs and tissues in the human body, and this Phantom Torso is embedded with hundreds of radiation sensors throughout his body. He even has real human blood cells.

"We put blood cells in small tubes in the stomach and in some places in the bone marrow," some of which are deep within the torso while others are close to the surface where there's less "tissue" to block radiation. "One of the questions we have is whether the less shielded parts of the bone marrow will be [much harder hit]," raising the risks of leukemia and other cancers. Using real blood cells lets scientists see how much the radiation damages the cells' DNA. High-speed particles of proton radiation can smash into DNA, breaking the string-like molecules. Cells can usually repair these breaks, but if several breaks occur within a short period of time, the damage can be irreparable. At best, the cell will then self-destruct. At worst, it will go haywire and grow out of control, becoming cancerous.

To subject Matroshka to a 1972-style radiation storm, scientists have devised a way to simulate that event using a high-energy proton beam at NASA's Space Radiation Lab in Brookhaven. The beam fans out so that, at the point where Matroshka sits, it's 60 cm across — large enough to engulf the entire torso. By stepping the energy of the beam through a series of energy levels, scientists can mimic the unique energy spectrum of the protons in the 1972 event.

In the upcoming experiment, led by Guenther Reitz of the German Aerospace Center (DLR) in Cologne, Matroshka's radiation sensors will reveal how much proton radiation reaches various parts of the mannequin's body. "With protons, you might have an order of magnitude (a factor of ten) difference from one part of the body to another," notes Cucinotta. The readings will help mission planners figure out how much shielding is necessary to protect real astronauts from a 72-style storm. The results will also point researchers in the right direction for medical treatments that might help mitigate the effects of such an event. Unlike a real astronaut, Matroshka can withstand multiple flares with no lasting side effects. A quick transfusion of blood cells and voilà--Matroshka is ready for another blast.

So let the flares begin - and stay tuned for results.

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Keep Looking Up!

East Valley Astronomy Club
PO Box 2202
Mesa, Az. 85214-2202