Volume 24 Issue 9

September 2010

The Observer

East Valley Astronomy Club

From the Desk of the President

by David Douglass

Oops... here I am on vacation, enjoying the nice cool Oregon weather, and it is the 3rd of September. I just received an email from our trusty newsletter editor, asking where my article was!

Well, I guess I better put some relevent thoughts in print. I may be on vacation, but there is still a lot of activity on the EVAC front lines.

We have firmed up our permits for the All Arizona Star Party to be held on November 5th and 6th. All the information is now published at the EVAC web site. You will find the link at the bottom of the left column on the home page.

Our search committee for a new dark sky site is still searching. No definitive selection at this time. This is NOT an easy task.

Our Calendar for the website has been giving us problems. We are in the process of establishing, and populating a new Calendar at Google. One of the nice things about the Google Calendar is that it is easy to configure, and best of all... It is free!

According to our events coordinator (Randy Peterson), and his able assistant (Lynn Young), there are many schools already scheduling evening star parties. 2010-2011 promises to be a busy season for school star parties.

I will miss the September meeting, but will return for the October meeting. And that is when we will open nominations for 2011 officers. Hopefully, some of you are considering this opportunity. In the meantime, I hope everyone keeps working on our observing programs. I know I am.

If only I could figure a good way to handle all this Oregon Dew !!!

Keep Looking UP!

The Backyard Astronomer

Stars of the Summer Triangle

by Bill Dellinges

It may come as a shock, but the Summer Triangle is still overhead at the beginning of September and dominates this month's skies. What better time to take a look at its three principal stars?

The Summer Triangle is an asterism, not a constellation. We simply draw a line connecting Deneb in Cygnus, Altair in Aquila, and Vega in Lyra. Let's start with what appears to be the dimmest of the trio. Deneb (Arabic for "Hens Tail") has an apparent magnitude of +1.26 and is the brightest star in Cygnus, the Swan. We shall see that Altair (+0.77) and Vega (+0.04) are brighter in apparent magnitude, but this can be deceiving in sizing up which star is intrinsically the largest and most luminous. To judge that, one must compare their absolute magnitudes. To determine this, we imagine that all candidates are at the same distance which, by convention, is ten parsecs or 32.6 light years. Now we judge their brightness. Turns out, Deneb is a monster star, 20 times the mass of the Sun and almost as large as Earth's orbit. Its absolute magnitude is -7.1. Altair and Vega check in at +2.2 and +0.5, respectively. Deneb brightened up because it went

Continued on page 2

Upcoming Events:

Local Star Party - September 4

Public Star Party - September 10

Deep Sky Observing Night - September 11

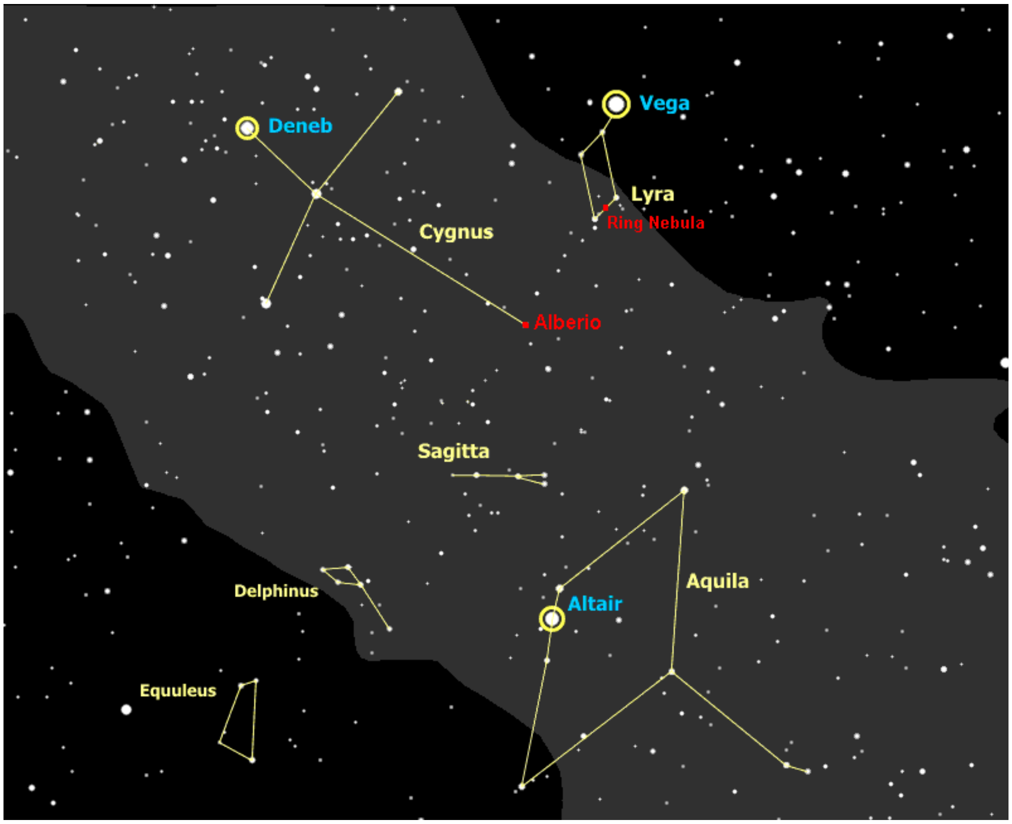
Monthly General Meeting - September 17

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

Inside this Issue:

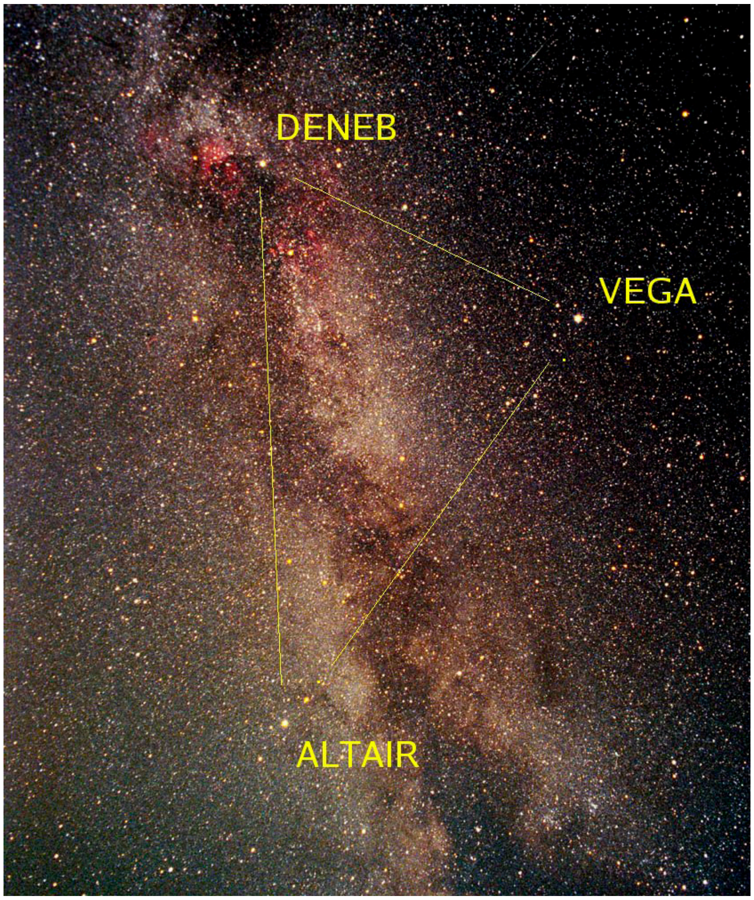
The Backyard Astronomer

Continued from page 1 from a distance of 1400 light years to 32.6. Altair dimmed because it was moved from 16 light years to 32.6 light years from us. Vega dimmed slightly, +0.04 to +0.50, getting pushed back a tad from its 25 light year distance.



Deneb's luminosity is 60,000 times that of our Sun. If Deneb was as close to us as Sirius (8.6 LY), its apparent magnitude would be -12, as bright as the full moon. If placed at the Sun's distance, it would vaporize Earth. For humans to survive Deneb's radiation, Earth would need to be 250 Astronomical Units away from this powerhouse For comparison, Pluto is 39 AU's away from the sun. In one second, Deneb puts out as much energy as the Sun does in 24 hours. Deneb is among one of the most luminous stars in the Galaxy. Yet, because of its distance, it's the dimmest of the Summer Triangle stars. Think about that the next time you look at it! Altair and Vega are by comparison rather modest sized stars, though still both larger than the Sun.

All three stars are spectral class A, being white in color and hotter than the Sun. But Deneb is a special case of having a luminosity sub class of (Roman Numeral) I (Supergiant), while the other two are luminosity sub class V (Main Sequence).



Altair is 1.5 times the diameter of the Sun and 1.7 its mass. Vega is 3.15 times the size of the Sun and 2.5 times as massive. Altair and Vega have rapid rotation periods of about 10 hours compared to the Sun's 25-30 day period - stellar spectral classes O,B,A,F tend to have high rotational speeds.

Altair, from the Arabic "Flying Eagle", was the star featured in the 1956 science fiction movie "Forbidden Planet." It's somewhat unique in that it has two slightly fainter stars, Tarazed and Alshain, either side of it making for a distinctive trio that draws your attention. Vega, from the Arabic "Swooping Eagle", was the star Jodie Foster traveled to in "Contact" (or did she?). Recent studies indicate Vega's axis of rotation points our way. Thus, to an observer on a planet orbiting Vega (with an inclination close to zero), the Sun would be a magnitude 4.2 pole star. We will return the favor around 13,500 A.D. when Vega becomes our north star due to Earth's precession, albeit by a generous 5.7 degrees compared to our current 0.73 degrees (44′) from Polaris.

Vega a "Swooping Eagle"? It's supposed to be a lyre. What gives? While Cygnus is accepted as a swan and Aquila an eagle, Lyra is generally thought of as a lyre, but in some ancient illustrations the constellation is depicted as a lyre held in the grasp of an eagle or vulture. The history of constellations shows many variations on a theme. One version of Lyra has its owner, the virtuoso Orpheus killed off and thrown into a river along with his lyre. The Gods sent an eagle (or vulture) to retrieve it and both were enshrined in the heavens – the lyre and eagle, not Orpheus.

So, in a way, we have three birds representing the Summer Triangle. Perhaps a more fitting moniker for this region of sky would be the Summer Aviary!

White Dwarfs (Part Two)

by Henry De Jonge IV

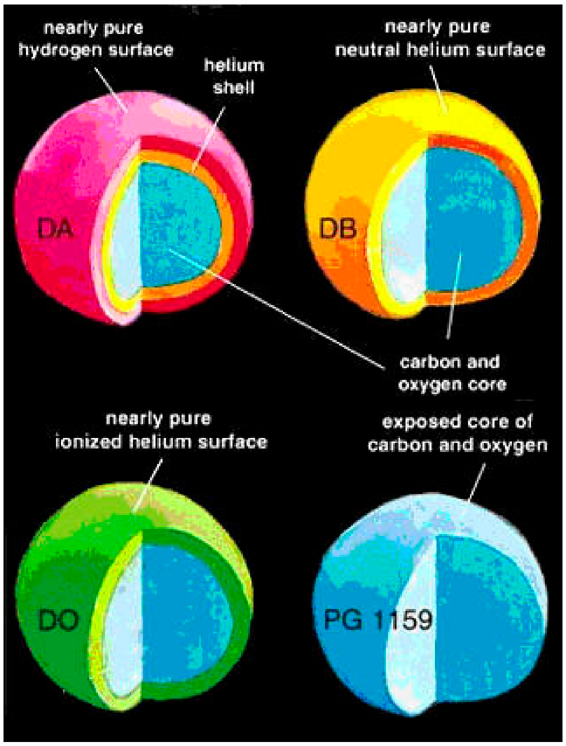
What types of WD are there?

In this article we will continue our examination of WD and talk about their types and influences. As we touched upon last month, they actually come in a variety of classifications such as He, CO, and ONeMg. The CO, (carbon-oxygen) core is the most common type, especially in our galaxy. WD also vary in their external or surface composition which influences their spectra via their external temperature. It is also of note that many, (hundreds to date) of WD are know to have magnetic fields, some of considerable strength. How this fully affects WD is unknown.

WD Cores, surfaces, & spectra

How are these different cores of WD formed? In very low mass stars, (< <1 solar mass) He may never ignite in the core thus forming a He core WD, (with a strong H atmosphere, thus influencing the spectra). In intermediate mass stars, (roughly 0.6-7 solar masses) the He will fuse into heavier elements such as C and O. This typifies the vast majority of stars and thus WD cores. Stars of heavier masses that do not explode in SN may fuse C into Ne and or Mg. They may be spared from going SN through extensive mass loss prior to becoming a WD. Remember that the final mass of any WD cannot exceed the Chandrasekhar limit no matter what the original mass of the progenitor.

Most WD have a thick coating of H and/or He that block astronomers from peering inside into their cores. Since H and He atmosphere WD have different cooling rates the knowledge of the mass, spectral type and initial mass to final mass relationship needs to be better defined to make accurate models of WD cooling sequences. Atmospheric models are also used to determine the effective temperature of the WD and thus how the varying composition will affect their temperature.



Typical types of WD and their primary spectral classification

Recently the Sloan Digital Sky Survey (SDSS), through its comprehensive spectroscopic snapshot of the Galactic stellar population, has revealed a small class of hydrogen-deficient white dwarfs. Their spectra are consistent with nearly pure carbon atmospheres. It has been suggested that these "hot" WD represent the evolutionary link between objects such as PG1159, (a hotter, rich He WD) and 1H1504+65, (a cool C rich WD). Some WD have undergone surface mass loss from various causes and have a near pure core exposure. One of the most extreme WD cases known to date is 1H1504+65, which is both H and He deficient, representing a hot, naked CO surface.

Currently all known white dwarfs for which photospheric oxygen and carbon abundances have been determined have abundance ratios of O/C<1. Some stellar models predict that the most massive stars avoiding core-collapse will result in ONe white dwarfs with very low carbon abundances which could make the ratio O/C>1. This would happen if a core lost its hydrogen envelope, producing extremely O rich spectrum. SDSS 1102+2054 is a unique white dwarf with a surface spectrum totally dominated by absorption lines of O.

The low H abundance of WD such as SDSS 0922+2928 and SDSS 1102+2054 suggest that they underwent a late shell-flash, leaving a He dominated atmosphere. At the low temperatures of these stars, the He convection zone extends sufficiently deep to dredge core material up into the atmospheres. Given the large age of the two stars (> 500Myr), gravitational diffusion will unavoidably lead to a larger concentration of carbon in the envelope. The best plausible explanation for the observed O/C abundances is that these two white dwarfs have overall very low carbon mass fractions, and hence represent a naked ONe core. As such, they are distinct from stars like 1H1504+65 and the "hot" white dwarfs.

The spectral classification of WD is subject to variations but does have some central guidelines for labeling. The first letter is a D followed by other letters that signify key features of their spectrum. This can be followed by additional letters for secondary features and even a number to typify their temperature. For example, WD types DA have H lines present with no He or metal lines. These are the most common WD spectra, (about 75%) of WD. Smaller percentages can have He dominated spectra or C dominated spectra.

What do the differences mean?

The models used for cooling rates and ages rely heavily on the assumed internal composition and mass of the WD core. The cooling age of a pure C core WD would be about 20-30% longer than for a mixed or He core WD. Cooling rates and the determination of WD ages is a critical part of stellar evolution theory.

SNIa are generally attributed to thermonuclear explosions of CO WD stars in binary systems, (although other models such as 2 WDs merging are also considered). These explosions need to originate in at least binary systems. That is the WD has at least one or more companions that orbit a common center of gravity. It is likely that many of these WD binary systems formed from a common envelope of gas and dust initially. In the most commonly accepted SNIa model the WD is assumed to accrete enough mass, (mostly H) from

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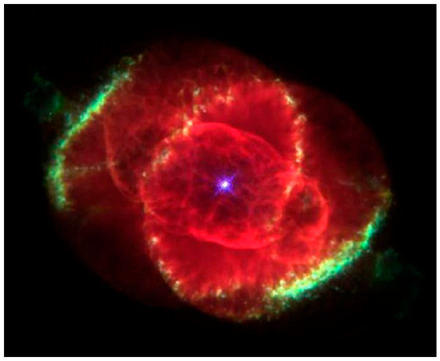
White Dwarfs (Part Two)

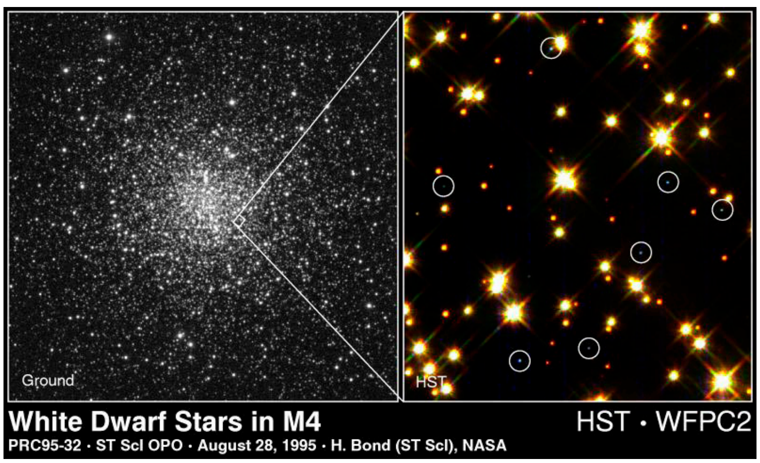
Continued from page 3

a companion to bring its total mass to over the Chandrasekhar limit, (about 1.378 solar masses), initiating carbon fusion in the core of the WD. This can last for about 100 years as the WD still cools via convection. Eventually one or more "hot spots" within the WD ignite into a runaway fusion reaction generating a flame. Through turbulent reactions this outward flame begins to speed up and before it reaches the surface of the WD causes it to explode. This flame consumes the WD material as it spreads out from near the core leading to an explosion that can last about 1-2 seconds. Interestingly, the outgoing flame thickness is thought to be only in the range of inches.



Cat Eye nebula with WD in center

The observed spectra of these explosions show strong intermediate-mass elements such as Si, Ca, and S. These elements are synthesized in thermonuclear explosive burning at low densities and therefore the WD material must expand before it is incinerated. This can only be achieved if the flame propagates sub-sonically, (a deflagration). Before reaching low densities, however, the flame burns the higher density core material to iron-group elements, predominantly Ni. During radioactive decay, this Ni isotope releases gamma rays which are scattered down to optical wavelengths in the ejecta and make the supernova bright.



WD, (circled stars on right) in M4 as seen by the HST

The initial conditions, the ignition phase, the pre-explosion phase, and the exact role of turbulence, (convection currents) still remain unknown and can tax, (or exceed) the limits of today's supercomputers in simulations.

The metal content, (core composition) of the WD definitely has an effect on the SNIa spectrum and their use as cosmic distance indicators. The composition of the ejecta in SNIa explosions is dependent upon the type of WD that is disrupted. Thus a better understanding of WD properties and nature will help better qualify SNIa as standard candles. Currently the best understanding of this relationship is based upon observation. There are observed different types of SNIa, sort of sub classes from the "normal" SNIa. One common property is that the smaller the mass of the companion star the expected longer time prior to a SN explosion due to the WD accreting mass from the companion.

In the end most stars of about 0.8 solar masses will form WD of about 0.53 solar masses. Stars between 7-10 solar masses may end their lives as weak SN II or more massive WD. These heavier stars will burn C and can end up as ONe core WD. This final outcome can depend upon such parameters as mass loss, nuclear reactions and rates, and convection. As an example, assuming that the oldest observable stellar populations in the Universe are the same age as globular clusters like M4, (a great place to locate WD it would seem) and we can spectroscopically resolve the WD in M4 with the HST. Then several models of stellar evolution theory have long suggested that the masses of population II white dwarfs forming today should be between 0.51 solar masses and 0.55 solar masses. The maximum mass of a WD is about 1.4 solar masses, while the minimum is suspected to be about 0.17 solar masses. The average is between .5-.7 solar masses.

Thus we see that the cores and atmospheres of WD can affect their temperature, spectra, lifetimes, their evolutionary path, and the SN properties, (if this occurs).

Conclusions

The advances in WD understanding will help tremendously in furthering the evolution of stellar models and our better understanding of SNIa, (especially as standard candles). Future spectroscopic studies of WD in nearby globular clusters and in the Milky Way with better telescopes and better detectors should reveal more information on final masses, composition, and temperature. It will also allow us to peer further out and see if the relations we now know locally for WD are more universal.

There is overall a direct relationship between WD final mass and luminosity, (as with most stars). There is also a relationship with the final mass of a WD and its progenitor mass. The mass loss rate and final states of WD in regards to metallicity still need to be better refined and extrapolated. Currently there are still too many WD models. It is also thought that the WD cooling rate may be useful in the future as a distance metric provided we have a better understanding of the model and the dependencies upon metallicity and core composition. One exciting relatively new area of research is WD asteroseismology. It may be able to shed more light on the core composition of WD but is in its infancy now. In one idea of this new research, if the WD pulsates then it may be possible to detect some of the core material on the surface.

Thus we see that all WD are not created equal nor do they end up all alike. There is still much to learn about these slowly cooling stellar embers.

September Guest Speaker: Ken Zoll

Ken Zoll is the current president of the Verde Valley Chapter of the Arizona Archaeological Society. He is also Co-Chair of the Conference on Archaeoastronomy of the American Southwest (www.caasw.org). Ken is a researcher of ancient astronomical practices for the Coconino National Forest and has consulted on archaeoastronomy sites in other parts of Arizona. He has authored *Sinagua Sunwatchers: An Archaeoastronomy Survey of the Sacred Mountain Basin*, a monograph that explains his discovery of a 1,000 year old solar calendar. His newest book, *Understanding the Rock Art of Sedona*, is an introduction to the rock art of the Sedona/ Verde Valley area. All proceeds from the sale of his books go to Friends of the Forest and the Arizona Archaeological Society for cultural preservation.

Ken will discuss and show images from his forthcoming book *Ancient Astronomy of Central Arizona* that documents several of his new discoveries. He will also touch on his two-year study for the Center for Desert Archaeology of an alleged ancient astronomical observatory in Springerville, Arizona.

Gene and Randy out observing... wrapping up the Herschel 400? Starting on the Herschel II?

◑ Last Quarter Moon on September 8 at 03:29

○ New Moon on September 14 at 22:49

◐ First Quarter Moon on September 23 at 02:18

● Full Moon on September 30 at 20:53

Classified Ads

Astronomy Calendars for 2011 will be for sale starting at the September monthly general meeting. Suggested cost is $12.95 plus shipping, but the cost to you at the meeting is $8.00 cash or check only. Correct change is appreciated. First come, first served at each successive month's general meeting until they are gone.

Your ad could be here!

http://grcoonline.org/obs.aspx

Upcoming Meetings

September 17

October 15

November 19

December 17

January 21

February 18

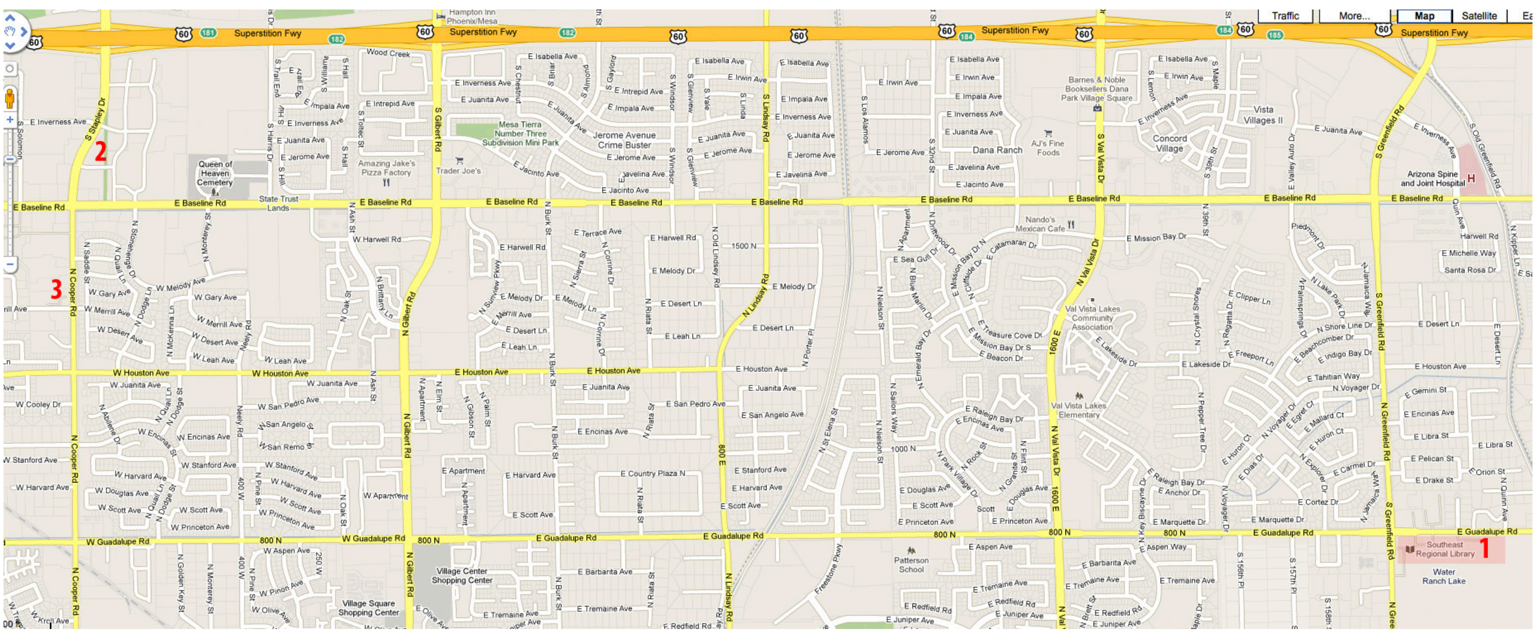
The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

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.

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.

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.

Visitors are always welcome!



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

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

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

September 2010

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		

September 4 - Local Star Party at Boyce Thompson

September 10 - Public Star Party & SkyWatch at Riparian Preserve

September 11 - Deep Sky Observing Night. Head to your favorite dark sky site and observe!

September 17 - General Meeting at SE Library

October 2010

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						

October 2 - Local Star Party at Boyce Thompson Arboretum

October 8 - Public Star Party & SkyWatch at Riparian Preserve

October 9 - Deep Sky Observing Night. Head out to your favorite dark sky site and observe!

October 15 - General Meeting at Southeast Regional Library

East Valley Astronomy Club -- 2010 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

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$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

NASA's Space Place

The Turbulent Tale of a Tiny Galaxy

by Trudy Bell and Dr. Tony Phillips

Next time you hike in the woods, pause at a babbling stream. Watch carefully how the water flows around rocks. After piling up in curved waves on the upstream side, like the bow wave in front of a motorboat, the water speeds around the rock, spilling into a riotous, turbulent wake downstream. Lightweight leaves or grass blades can get trapped in the wake, swirling round and round in little eddy currents that collect debris.

Astronomers have found something similar happening in the turbulent wake of a tiny galaxy that is plunging into a cluster of 1,500 galaxies in the constellation Virgo. In this case, however, instead of collecting grass and leaves, eddy currents in the little galaxy's tail seem to be gathering gaseous material to make new stars.

"It's a fascinating case of turbulence [rather than gravity] trapping the gas, allowing it to become dense enough to form stars," says Janice A. Hester of the California Institute of Technology in Pasadena.

The tell-tale galaxy, designated IC 3418, is only a hundredth the size of the Milky Way and hardly stands out in visible light images of the busy Virgo Cluster. Astronomers realized it was interesting, however, when they looked at it using NASA's Galaxy Evolution Explorer satellite.

"Ultraviolet images from the Galaxy Evolution Explorer revealed a long tail filled with clusters of massive, young stars," explains Hester. Galaxies with spectacular tails have been seen before. Usually they are behemoths - large spiral galaxies colliding with one another in the crowded environment of a busy cluster. Tidal forces during the collision pull gas and stars of all ages out of these massive galaxies to form long tails. But in IC 3418, the tail has just young stars. No old stars.

"The lack of older stars was one tip-off that IC 3418's tail isn't tidal," says Hester. "Something else must be responsible for these stars" Hester and eight coauthors published their findings in the June 10, 2010, issue of The Astrophysical Journal Letters.

In the ultraviolet image on the left, from the Galaxy Evolution Explorer, galaxy IC 3418 leaves a turbulent star forming region in its wake. In the visible light image on the right (from the Sloan Digital Sky Survey), the wake with its new stars is not apparent.

The team described the following scenario: IC 3418 is speeding toward the center of the Virgo cluster at 1,000 kilometers per second. The space between cluster galaxies is not empty; it is filled with a gaseous atmosphere of diffuse, hot hydrogen. Thus, like a bicyclist coasting downhill feels wind even on a calm day, IC 3418 experiences "a stiff wind" that sweeps interstellar gas right out of the little galaxy, said Hester - gas that trails far behind its galaxy in a choppy, twisting wake akin to the wake downstream of the rock in the babbling brook. Eddy currents swirling in the turbulent wake trap the gas, allowing it to become dense enough to form stars.

"Astronomers have long debated the importance of gravity vs. turbulence in star formation," Hester noted. "In IC 3418's tail, it's ALL turbulence." To many astronomers, that's a surprising tale indeed.

See other surprising UV images from the Galaxy Evolution Explorer at http://www.galex.caltech.edu. Kids (and grownups) can play the challenging new Photon Pileup game at http://spaceplace.nasa.gov/en/kids/galex/photon/ .

If It's Clear...

by Fulton Wright, Jr.

Prescott Astronomy Club

September 2010

Celestial events (from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is ½ degree or 30 arcminutes in diameter. All times are Mountain Standard Time.

On Monday, September 6, after 9:50 PM, you can watch an entire transit of Io in front of Jupiter. At 9:52 PM the satellite's shadow falls on the planet. At 10:15 PM the satellite moves in front of the planet. At 12:06 AM the shadow leaves the planet. At 12:27 AM the satellite moves from in front of the planet.

On Tuesday, September 7, it is new Moon and you have all night to hunt for faint fuzzies.

On Tuesday, September 14, the Moon is at first quarter phase and sets at 11:05 PM.

On Tuesday, September 14, after 11:00 PM you can watch some interesting events with Jupiter's moons. At 11:28 PM Io appears from behind Jupiter. About 11:50 PM Callisto's shadow falls on the very southern part of Jupiter. About 1:15 AM Callisto's shadow leaves Jupiter. About 2:00 AM Callisto itself passes just south of Jupiter's disk.

On Friday, September 17, starting just before 9:00 PM, you can watch an entire transit of Ganymede in front of Jupiter. At 8:55 PM the satellite's shadow falls on the planet. At 9:25 the satellite moves in front of the planet. At midnight the shadow leaves the planet. At 12:12 AM the satellite moves from in front of the planet. Also, for about a week around this date, Uranus is less that 1 degree north of Jupiter. (See Sky & Telescope magazine, September 2010, p. 56 for a finder chart.)

On the night of Monday, September 20, after 1:30 AM (actually the 21st), you can see an unusual transit of Io in front of Jupiter. Because Jupiter is at opposition from the Sun, the shadow appears barely north of the satellite. Both enter Jupiter at 1:42 AM and leave at 3:55 AM.

On Tuesday, September 21, in the early evening, you can observe another opposition satellite-transit of Jupiter, this time with Europa. Jupiter rises at 6:26 PM. The satellite and its shadow enter the planet at 6:59 PM and leave about 9:42 PM. The shadow is just to the upper left of the satellite in the real sky. Your telescope may invert or mirror the image. As an added attraction, Io goes behind the planet at 10:58 PM. This is the date that Jupiter is the biggest (49.9 arc-seconds) and the brightest (magnitude -2.9) it has been since October 1963 (although you will hardly notice any change this month).

On Wednesday, September 22, after 8:00 PM, you can see another opposition satellite-transit of Io. This one is at a more convenient time and only slightly less close. Entrance is at 8:10 PM and exit is about 10:23 PM.

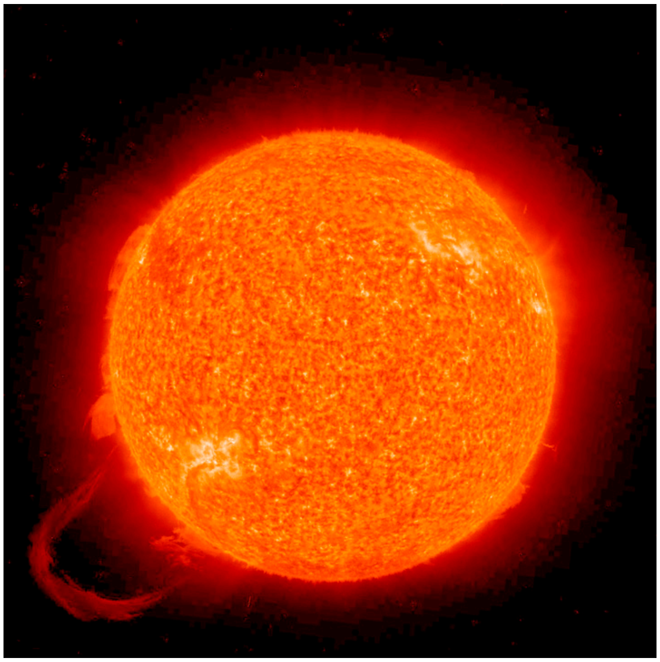
On Friday, September 24, at 5:53 PM (33 minutes before sunset), the full Moon rises, so no hunting for faint fuzzies tonight.

On the night of Friday, September 24, after 12:30 AM (actually the 25th) you can see a complete transit of Ganymede in front of Jupiter. 12:38 AM satellite enters. 12:57 AM shadow enters. 3:28 AM satellite leaves. 4:00 AM shadow leaves.

On Tuesday, September 28, after 9:00 PM, you can see an entire transit of Europa in front of Jupiter. 9:13 PM satellite enters. 9:36 PM shadow enters. 11:55 PM satellite leaves. 12:19 AM (the 29th) shadow leaves. Added attraction, 12:42 AM Io goes behind Jupiter.

On Wednesday, September 29, after 9:30 PM, you can see an entire transit of Io in front of Jupiter. 9:52 PM satellite enters. 10:05 PM shadow enters. 12:05 AM (the 30th) satellite leaves. 12:19 AM shadow leaves.

On Thursday, September 30, the Moon is at third quarter phase and rises at 11:23 PM.



NASA's STEREO (Ahead) spacecraft watched as an eruptive prominence rose up and arched out in a horseshoe shape far above the Sun's surface (Aug. 25, 2010). The image shows the action in an extreme UV wavelength as an eruptive prominence churns, then rises up, arches out, and finally breaks apart and dissipates above the solar surface. Prominences are clouds of relatively cool gases suspended in the Sun's hot corona by magnetic fields that sometimes break loose to create these dramatic eruptions. This is one of the largest eruptive prominences we have seen in several years.
Image courtesy of Solar and Heliospheric Observatory. SOHO is a project of international cooperation between ESA and NASA.

EVAC *Six Asteroids*

Richard Harshaw
(26586) Harshaw 2000 EF116 2000 03 10 Catalina 68447 Hill, R.
The following citation is from MPC 68447:
(26586) Harshaw = 2000 EF116
Richard Harshaw (b. 1954) is an Arizona amateur astronomer who makes measurements of double stars. He has served in numerous official positions with astronomy clubs.

Gene A. Lucas
(17250) Genelucas 2000 GW122 2000 04 11 Fountain Hills 43193 Juels, C. W.
The following citation is from MPC 43193:
(17250) Genelucas = 2000 GW122
Gene A. Lucas (b. 1946), an amateur astronomer and telescope maker since 1961, cofounded the Saguaro Astronomy Club in Phoenix in 1977 and was an astrovideography pioneer in live public-television broadcasts of comet 1P/Halley during 1985-1986.

Delores H. Hill
(164215) Doloreshill 2004 MF6 2004 06 25 Catalina 61270 CSS
The following citation is from MPC 61270:
(164215) Doloreshill = 2004 MF6
Dolores H. Hill (b. 1956) is a meteoriticist with the University of Arizona's Lunar and Planetary Laboratory, where she has, since 1981, classified meteorites using microprobe analysis, neutron activation methods and inductively coupled plasma mass spectrometry.

Richard (Rik) Hill
(118945) Rikhill 2000 WS68 2000 11 29 Junk Bond 58597 Healy, D.
The following citation is from MPC 58597:
(118945) Rikhill = 2000 WS68
"Amateur turned Pro" best describes Rik Hill (b. 1949). Well known among amateur astronomers for his outreach activities, Rik currently works with the Catalina Sky Survey on Arizona's Mt. Lemmon searching for potentially hazardous asteroids. He has seven comet discoveries to his credit.

Jennifer Polakis
(146268) Jennipolakis (2001DQ = 1995 SB76)
Discovered 2001 Feb. 16 by D. Healy at Junk Bond Observatory.
The following citation is from MPC 59925:
(146268) Jennipolakis = 2001 DQ
Jennifer Polakis (b. 1959) is an American amateur astronomer, eclipse chaser and popularizer of astronomy. She has served as an officer of the Saguaro Astronomy Club of Phoenix, Arizona. She is the wife of professional engineer and amateur astronomer Tom Polakis.

Tom Polakis
(4078) Polakis 1983 AC 1983 01 09 Anderson Mesa 27126 Skiff, B. A.
The following citation is from MPC 27126:
(4078) Polakis = 1983 AC
Named in honor of Thomas A. Polakis (b. 1961), mechanical engineer and friend of the discoverer. As an observer of the sky, he exemplifies all that is best in an amateur astronomer.

The Six Asteroids (from left): Richard Harshaw, Gene Lucas, Delores Hill, Rik Hill, Jennifer Polakis, Tom Polakis

For asteroid data, see IAU Minor Planets Center (MPC) Minor Planets Names List

http://www.cfa.harvard.edu/iau/lists/MPNames.html

http://www.minorplanetcenter.org/iau/lists/MPLists.html

The Deep Sky Object of the Month

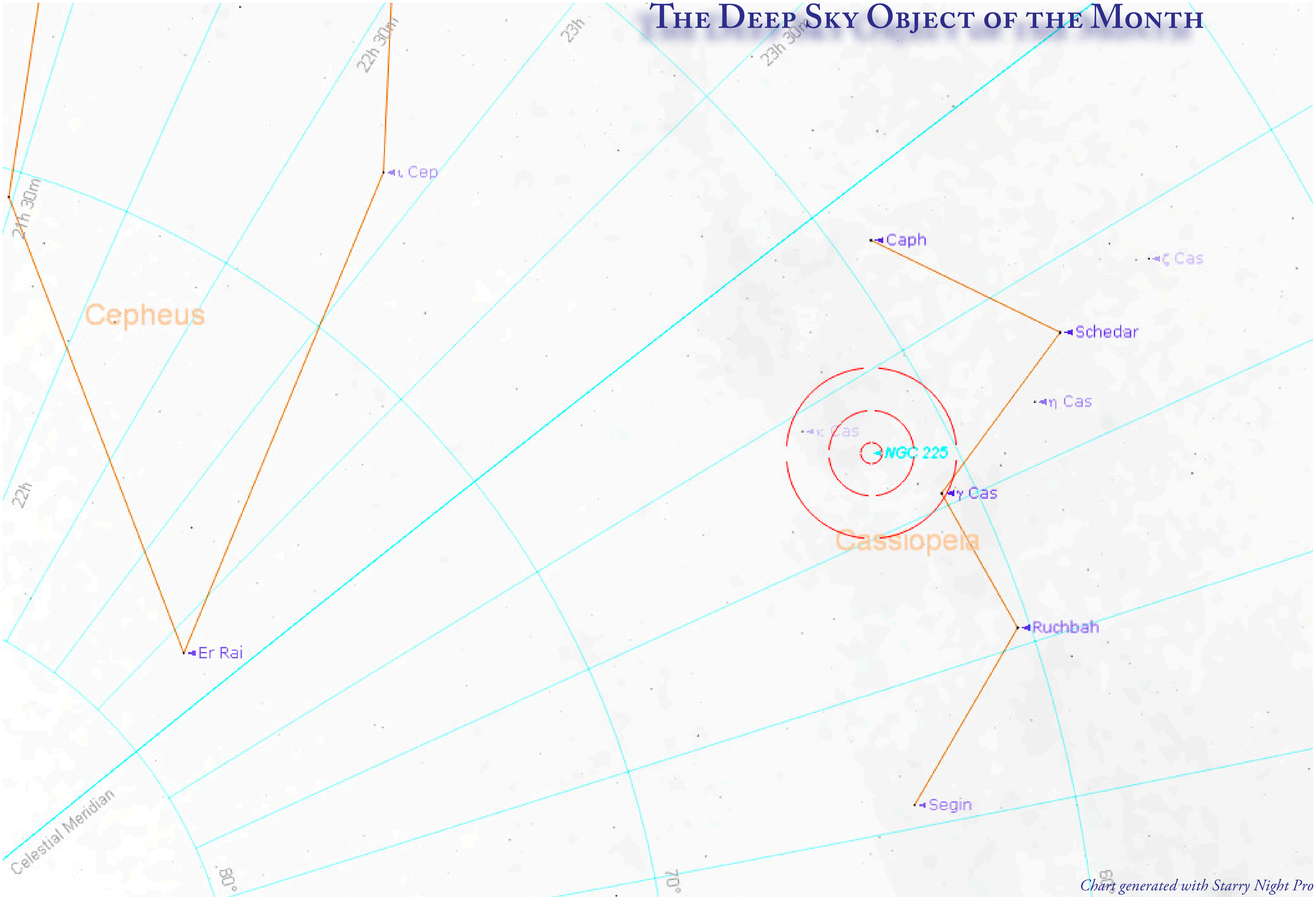


Chart generated with Starry Night Pro

NGC 225 (Sailboat Cluster)   Open Cluster in Cassiopeia

RA: 00h 43m 39.0s   Dec: +61° 46' 30"   Magnitude: 8.90   Size: 12.0'

A new book tells the inspiring true story of the astronomer who has discovered more planets than anyone else... and keeps finding more.

Planet Hunter: Geoff Marcy and the Search for Other Earths by Vicki Oransky Wittenstein (Spring 2010, Boyds Mills Press) recounts the astronomer's personal struggles and headline-grabbing discoveries. Marcy, a professor at the University of California at Berkeley, has found and helped to find nearly half of the 400-plus planets that lie outside our solar system.

Wittenstein, of Brooklyn Heights, New York, interviewed Marcy and several other planet hunters. To gain firsthand knowledge of how Marcy makes the fine measurements that reveal distant planets, she visited him at the W. M. Keck Observatory on Mauna Kea, a dormant volcano on the Big Island of Hawaii.

In addition to telling Marcy's story, Wittenstein shows how other astronomers are using various methods to find even more "extrasolar" planets. Finally, she explains how their work has advanced the search for life on other worlds.

The book shows how Marcy's work set the stage for major NASA programs that are underway today and planned for the future, with Marcy's participation and leadership. For example, the Kepler space telescope is now orbiting Earth and scanning the skies for smaller and smaller planets. The goal is to find Earth-sized planets that have water and other characteristics that may make life possible.

Young readers will relate to the story of Geoff Marcy as a boy, gazing at the stars through a small telescope and wondering about life on other worlds. As he worked through his university studies, Marcy rose above the criticism of his professors and, finally, of other astronomers.

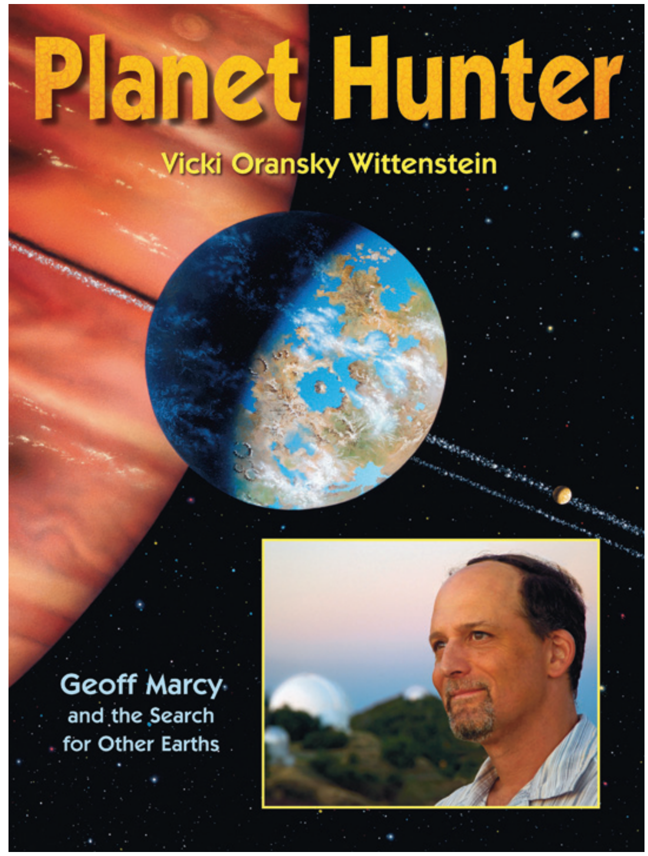
In the 1980s, most astronomers thought Marcy's plan was a fantasy. They thought it would be impossible to detect a planet that orbits another star. Still, Marcy and his colleague, Paul Butler, persevered. Finally, in the mid-1990s, their hard work paid off with the discovery of several planets, which are now accepted as landmark findings.

As a child, I loved to stare up at the night sky and wonder about life on other planets," Vicki says. "When the first extrasolar planets were discovered I was hooked!"

She has been writing for children for the past 15 years. A former prosecutor, an advocate for children and families, and a graduate of the Vermont College of Fine Arts, Wittenstein published articles in Highlights for Children, Odyssey, Faces, and The Best of the Children's Market. Planet Hunter is her first book.

Founded in 1991 and located in Honesdale, Pennsylvania, Boyds Mills Press is the trade book division of the Highlights for Children publishing group.

Planet Hunter: Geoff Marcy And The Search For Other Earths
Vicki Oransky Wittenstein
978-1-59078-592-8
Ages 10-14
9x12 inches; 48 pages; preprinted hardcover with jacket
$17.95



I recently had the opportunity to read *Planet Hunter*, and was delightfully entertained with both the book's content and the writing style of author, Vicki Oransky Wittenstein. This non-fiction science book was written for 10 - 14 year-old readers, and I think it will be just as enjoyable for them as it was for me.

The reader is taken along on Vicki's journey of discovery; not just of planet hunting, but also of planet hunters. We are introduced to Dr. Marcy, his assistant, Jason McIlroy, and other scientists. We get a look inside the famed Keck Observatory to see how these scientists ply their trade.

Topics such as Doppler effects, spectral fingerprints, planet hunting with a spectrometer, habitable zones, and alternate planet hunting techniques are well explained at a level appropriate to intended audience.

The book is very richly illustrated with photographs, artist renderings, and charts. There is also a full page of additional subject matter resources, as well as a glossary of the terminology used throughout the book.

The author has graciously provided a signed copy of the book which will be donated to the club's library.

Peter Argenziano -- Editor

The Observer is the official publication of the East Valley Astronomy Club. It is published monthly and made available electronically as an Adobe PDF document the first week of the month. Printed copies are available at the monthly meeting. Mailed copies are available to members for a slight surcharge to offset printing and mailing expenses.

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