October 2008 THE OBSERVER

East Valley Astronomy Club

From the Desk of the President by Claude Haynes

Nothing like the promise of ice cream to bring out astronomers; or so it would seem from the turnout at the Boyce Thompson volunteer party. Lot's of scopes, and lot's of interested observers. It was a beautiful night in the heavens and on the ground.

Another opportunity for public service to EVAC is through being an Officer or Board Member. Because of term limits there are a number of positions where we need volunteers. If you have been an officer in the past, or you are interested in volunteering please send me an email at president@ eastvalleyastronomy.org. I have had fun and highly recommend the challenge.

Hopefully we will have great skies on October 24th and 25th for the All Arizona Star Party. Friday night supper is a pot-luck, so bring items to share if you arrive early. Saturday night offers the Spaghetti Spectacular for only \$5. Raffle tickets are \$1 for a host of fabulous prizes. Even better is a chance to spend a crisp fall weekend

with friends and telescopes. That's a draw where everyone wins.

See you at the next meeting for a much anticipated talk by Fulvio Melia.

Check the website for details on coming events and to sign up for the All AZ Star Party.

In accordance with the club's constitution and bylaws, nominations for Officer or Board positions shall be opened at the October general meeting and shall be publicized prior to the November general meeting. Nominations will be closed at the start of the November general meeting. Officers shall be elected by a simple majority of the General Assembly present at the November general meeting. Is this the year you get involved? The future of EVAC depends on you. Contact a current officer for more information.

The Backyard Astronomer A Tale of Telescopes by Bill Dellinges

on't try this at home... How does one end up with eleven telescopes? I didn't mean to, it just happened. 1955: (just after the last Ice Age). Having caught the astronomy bug from looking at the beautiful black and white plates - yes, "black and white" and yes, "plates" in Fred Hoyle's Frontiers of Astronomy, I knew at once I required a telescope to pursue this hobby. My 4" F11 Criterion Dynascope (\$45 then - I'm including prices for historical reference) would be the first of many telescopes to pass through my hands. I can still recall the smell of the Bakelite tube -you could stick your nose into its Newtonian opening and get high off it. The telescope served this 12 year old admirably until that fate-

ful night when I found the Ring Nebula overhead, with the tube aimed straight up and slightly out of balance. I ran up the front stairs and proudly announced to my mother, busy washing dishes, "Hey, Mom, I found the Ring Nebula, want to see it !?" I then heard a crash. Spinning around, I was horrified to see the scope had fallen over backwards. The impact pushed the focuser and viewfinder through the bakelite tube. The evepiece was rolling down the streets of San Francisco. I managed to repair the poor thing with electrical tape and my younger brother used it while I protected America from the communists with a four year coffee break - I mean stint in the Air Force.

1970: Following the

Continued on page 2



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Upcoming Events:

Deep Sky Star Party - October 4 Public Star Party - October 10 MCC Planetarium Gala - October 10 General Meeting - October 17 Local Star Party - October 18 Scottsdale Stadium Sleepover - October 18 Alma Elementary Star Party - October 23 All-Arizona Star Party - October 24-25

The Backyard Astronomer

Continued from page 1 military years and a few more entering the work force, I was ready for my first REAL telescope. I chose a Unitron 4" F15 refractor (\$785) mainly based on the impressive ads of this exquisite achromat in Sky and Telescope magazine. The company would hold that magazine's back cover from November 1953 to December 1971 (bumped in January 1972 by Celestron). Price note: It amazes me that their 4" price of \$785 remained so from 1953 to 1972! Can you imagine that happening today? It also amazes me that Japan could produce such a quality telescope and mount only eight years after being pulverized in WW II. The scope was one heck of a performer on the planets but left something

to be desired on deep sky objects due to its limited aperture.

1974: Thus I began to look for more glass and this new funny looking 8" Celestron Schmidt Cassegrain (\$1170) caught my eye. It would give me four times the light of the 4". Done. Out with the Unitron, in with the orange cement mixer. First light on M-13 blew my socks off. Wow! I could resolve the globular to the core - oh yeah, this was a keeper! I racked up many



Unitron 4" f15 Refractor

hours of observing and learning my way around the night sky with the C-8. I still have it to this day and never hesitate to recommend the C-8 to budding stargazers.

In the 70's Celestron also came out with the C-90 (a Maksutov), C-5, and C-14. I bought the C-90 (\$295) in 1978 because it was simply cute. The following year, 1979, I picked up the C-5 (\$499) as a grab and go scope and put it on an inexpensive light German Equatorial mount. It served that purpose well and accompanied me to Mexico for a May 1984 annular eclipse [see photo in S&T September 1984, page 280], Australia in 1986 on a Halley Comet tour, and numerous camping and traveling trips.

1979: My eye was also on that C-14 (\$4100) and when I read about an impending large price increase coming, I decided it was now or never and the behemoth joined my fleet. I have many fond memories of observing with that telescope at Lick Observatory, Fremont Peak, and Lake Tahoe.

1980: For some weird reason, I bought a Meade 4 ¹/₄" F5 Newtonian giant finder (\$165). I guess I thought it just looked cool. An airline strike in 1982 allowed me time to try my hand at grinding a mirror at the Chabot Observatory in Oakland, Ca. Thirty-five hours of grinding later, the 8" F4 mirror was ready – if not perfect! I assembled the optical tube (~\$300 in materials) and there it sat in my home, never to see a photon. I stood it on end and placed a lamp on it.

1982: One night at Lick Observatory (actually the "Brickyard",

one road mile below the summit of Mt. Hamilton) I was observing the double star Castor and Saturn with the C-14. Their images that night were just so-so. Another fellow had pulled into the area and set up a refractor. I went over to say hello and he let me look through his scope at Castor and Saturn. Castor was split cleanly into two dots and Saturn was razor sharp. "Jeez", I asked, "what the heck is this thing?" He said it was a 6" F9 Astro-Physics triplet by a guy named Roland Christen. Hmmmm, I might have to look into this! After seeing the A-P prices I decided a used Unitron 4" (\$800) would be an economical way to re-enter refractorland again. I bought one but was disappointed in its performance and

sold it.

1987: I saw a Meade 6" F6.3 Schmidt-Newtonian (OTA \$319) sitting in Lumicon's showroom. I had to have it. Why? Because it looked cool and probably rendered a huge field. I used it several times and soon lost interest in it. Another dust collector. However, I needed a Rich-Field telescope and picked up a 4 1/8" F4 Edmund Astroscan (\$269) on another Lumicon visit.

1990: Many a stargazer has drooled over those

Questar ads in S&T and I was no exception. I thought it was about time I rewarded myself with one of those coveted instruments. I ordered the 3.5" (\$3800). The first two weeks I just sat it on my desk as I admired it and fiddled with its knobs and levers. I took the Questar to the 1991 seven minute solar eclipse in Baja and got a pretty decent photo of totality through it. I was on a S&T tour and next to me was none other than Astro-Physic's Roland Christen with his beautiful 5" F8 refractor. It was love at first sight (the scope, not him). I knew then I'd have to get one (in the back of my mind too were those views through that guy's AP refractor on Mt. Hamilton in 1982).

1992: Following a fire sale of extraneous astro-stuff to finance the AP 5" OTA (\$2450), I sent my deposit in and got the scope five months later. As expected, it was awesome on planets, double stars, and the moon. I mounted it on a G-11 Losmandy GEM.

1995: Celestron reintroduced the C-5 in 1992, having been discontinued in 1984. My original C-5 had been sold to finance the 5" refractor. I had a brilliant idea! A 1995 C-5+ was for sale (\$900) on the used market. Why not buy it, use it as my new grab and go scope, sell the Questar and with the considerable money left over, go nuts on an astronomical spending spree! This was probably one of the most harebrained schemes I'd ever come up with. Thank god I had the foresight to compare performance of the two scopes before selling the Questar. After the "shootout" I promptly sold the C-5+.

Extragalactic Theories of HVCs and Observational Evidence by Henry De Jonge IV

This article is the final installment on the subject by the author.

Last section we discussed Galactic theories of HVCs in depth and in this final installment we will discuss extragalactic theories in depth and offer some conclusions.

In one of the better-known extragalactic theories, the HVCs are thought to be local building blocks of the Local Group composed up of neutral hydrogen as well as protogalactic, baryonic Cold Dark Matter, (CDM). In another extragalactic model, they are thought to be the tidal disruptions of satellite galaxies such as the LMC, SMC and other small dwarf galaxies.

In this extragalactic vein of thought, if the HVCs are local, primordial, building blocks of the Local group, (and galaxies in general) they may contain dark matter. In the standard model of galaxy formation, which also involves CDM, there are predicted to be hundreds of small clumps of matter scattered about the local group and orbiting the Milky Way. This is in contrast to the 20 or so luminous satellite galaxies we are aware of currently. In fact all the close known satellites of the Milky Way orbit in polar orbits about our galaxy. We have not noticed as yet any preponderance of HVCs or other matter orbiting as such.

This theory maintains that the HVCs are the building blocks

of the Milky Way and are left over from the formation of it and the rest of the Local Group. They are predicted currently to contain DM, have large masses of about 10^7 solar masses, and reside at distances of about 1 Mpc from the Milky Way. There were thousands of these clouds formed early in the universe near our region and were perhaps the first large structures to form. Over time they interacted and merged to form the Local Group we see today. There are also gas clouds seen along the filaments of galaxies that make clusters and models of such galaxy formations predict a gaseous "cosmic web".

Our galaxy and M31, (the two largest members of the Local Group) are still expected to be in the process of forming and absorbing these clouds. These clouds would therefore be expected to contain some of the primordial matter, (H, He, and Li close to primordial tion by providing the necessary fuel and momentum.

If this theory is correct there are several predictions that can be studied. One would be the metal content of the clouds should be lower than that of the main galactic medium. This is due to the fact that the main body of the galaxy has been producing stars. Stars produce the heavier elements, (elements like carbon, oxygen, and iron) which the clouds by themselves would not be able to do. This test can be accomplished by observing the metal content of clouds. This measurement is ongoing and still inconclusive overall.

Some evidence for this theory was found when a large cloud of hot, ionized, gas was found about the Milky Way and M31, (the hot coronal envelope previously mentioned) that according to this theory might be the result of thousands of cloud collisions over the history of the Local Group. This type of cloud would actually be present all throughout the Local Group.

In another thought it was suggested that an HVC named Complex H, is interacting with the Milky Way in the manner of a satellite companion. This HVC was first discovered in the 1970's and covers more than 100 degrees^2 at a very low Galactic latitude, (in the Galactic plane). It's velocity, (to the Local Std of Rest) is about 200km/sec and is estimated to be at least 5

kpc from the sun, with a total mass

of about 10^8 solar masses. It is in retrograde orbit about the Milky

Way, (with a period of about 10^9

years) and is being slowly stripped

away by the interaction, (merger).

Although normally this model would

suggest a further distance from us for this HVC, it is a satellite cloud and

is being absorbed by us as we evolve.

Galaxies are thought to normally ex-

Just recently a paper came out that

suggested that a separate HVC near

Local Group) had a rotation around

explained by DM. The mass calcu-

lated for the HVC is much larger

than any reasonable HI mass we

have been able to determine so far.

Thus this HVC could be one of the

first missing dark satellites that are

predicted by the standard model

of galaxy formation. It is located

about 700 kpc from the Milky

LGS 3, which could only be fully

the dwarf galaxy LGS 3, (in the

ist in such rich environments.



Figure 3: The spiral galaxy M 83 as seen at radio wavelengths. The false color image shows the neutral hydrogen gas, which is much more extended than the starlight in this galaxy, shown at the same scale in the inset image. The black contours show the locations of the high-velocity neutral gas clouds discovered by the team from the University of Michigan. The largest clouds are found over the spiral arms of the galaxy, where star formation is thought to be ejecting material out of the plane of the galaxy.

proportions and dark matter) which formed the earliest structures of the Local Group, about 13 billion years ago. These clouds would be still orbiting within the Local Group and colliding and merging with the members. During this continual interaction and merging they would also be expected to generate star forma-*Volume 22 Issue 10* Way and is one of the farthest HVCs known to date, (most are <50 kpc away). It also contains no stars. There is sure to be more data and simulations gathered about this example in the future as the implications are profound.

The local group is not the only galaxy

Continued on page 4 Page 3

Extragalactic Theories of HVCs and Observational Evidence

Continued from page 3 group that is known to contain intergalactic H1. The M81/M82/NGC 3077 group also contains H1gas that envelopes several close by galaxies. It has also been reported that evidence for HVCs were seen in some distant groups of galaxies, (in 10 out of 15 galaxies studied) and lying

in orbit at about the same distance as some of the clouds we see

locally, (about 10,000 ly). Another interesting find was that there

may also be the result of gravitational interactions between the Magellanic Clouds and our galaxy. There may be more than one explanation for HVCs.

It seems to me that as time goes on and our technology improves we will discover more close galactic encounters. It was recently announced that another galaxy, called the Canis Major dwarf galaxy, was also discovered colliding with the disk of the

appeared to be lower star formation in the galaxies without HVCs than those with HVCs. If this were true then an implication would be that they are left over from the group formation. It would also seem to support the galactic fountain model in that the clouds were produced by star formation and death in the galaxy and are surrounding the galaxies they originated from. Then later the infalling gas would again stir up star formation. Thus we again see evidence that would HVCs. If HVCs are tidal disruptions



seem to support two models of Figure 4: This map was generated from the Leiden/Argentine/Bonn (LAB) Galactic H I Survey (on the basis of a model of the gas distribution in the Milky Way. (2007). For ferent theories of how HVCs each position in the sky, the allowed range of radial velocities for Galactic HI emission formed and are forming. Some of satellite galaxies they could be *Mll emission outside this extended velocity range was considered high-velocity gas and* produced in the Local Group as was integrated to create the column density map above. The H I column density map

the result of either original enti- of the HVC sky was finally converted into the Hammer-Aitoff projection which has the more evidence and better ties orbiting around other satel- advantage of being an equal-area projection.

lite galaxies interacting, (mainly dwarf galaxies) or be produced as a result of absorption or interactions by galaxies. This is a sort of a combination theory.

Just recently again some new evidence in support of this interaction theory was announced by an article that formed the conclusion that the HVCs around our Galaxy are mostly scraps shed by satellite galaxies orbiting the Milky Way. This continues to say that these clouds are not associated with the CDM galactic origin theories. This was determined by studying the MS and the smaller HVCs that surround it. Some of these HVCs studied are part of the MS while satellite galaxies shed others. They also conclude that HVCs are not scattered about the Local Group but are within the extended halo of the Milky Way. They note that there are currently no other detected counterparts to HVCs in any other galaxy groups. This conclusion may be due to the inability to detect HVCs for instance, if they were too close to the galaxies under study. There is plenty of H1 detected in many other galaxies as we have seen.

In this research it was indicated also that the HVCs we have seen in the line of sight with the Sculptor Group of galaxies, (near our southern galactic pole) are not part of the Sculptor Group at all, but are shreds of a small satellite galaxy that the Milky Way has absorbed. One possible candidate galaxy is the Sagittarius dwarf galaxy, (discovered in 1993). These clouds

continue to modify these existing models and possibly develop others.

CONCLUSIONS

We have seen how HVCs come in many sizes, shapes, and directions. We have also seen how certain pieces of evidence could be used for different theories about the clouds. It is clear that all the evidence is not all yet in. Particularly more information on other galaxy groups with respect to HVCs would help support or modify the main theories we discussed. We certainly need more information on metal contents, distances, morphology, velocities, and distributions of HVCs.

In my opinion there seem to be different theories of origin depending on the nature and context of the HVC under study and it is unlikely that we will come to only one conclusion on their origins. Obviously neutral H was created in the beginning of the Universe and still exists today. There would also seem to be a direct connection with galaxies, galaxy interactions, galaxy groups, and HVCs.

It is a bit unnerving to realize just how many HVCs are known (and still unknown) and how much of space is occupied by them. It is truly astounding! They contain the basic building blocks of the Universe within them and yet they are so difficult to characterize and even detect, while the combinations and interactions they show are truly amazing.

Milky Way, (not associated with the galactic halo as expected). It is about 25,000 ly from the solar system and 42,000 ly from the center of our galaxy with a billion solar masses. This is even closer than the Sagittarius dwarf galaxy that is colliding with the Milky Way. There was no mention of any associated HVCs with this new discovery but it did have an associated stream of stars with it. It appears that our galaxy is still growing.

Thus we see there are difideas have been around for many decades. As we gather

understand the physics we will

October Guest Speaker: Fulvio Melia

Fulvio Melia is an Italian-American physicist/astrophysicist and author. He is Professor of Physics and Astronomy at the University of Arizona and Associate Editor of the Astrophysical Journal Letters. A former Presidential Young Investigator and Sloan Research Fellow, he is the author of six books and more than 230 articles on theoretical astrophysics.

Melia was educated at Melbourne University and The Massachusetts Institute of Technology, and held a post-doctoral research position at the University of Chicago before taking an assistant professorship at Northwestern University in 1987. Moving to the University of Arizona as an associate professor in 1991, he became a full professor in 1993. From 1988 to 1995, he was a Presidential Young Investigator, and then an Alfred P. Sloan Research Fellow from 1989 to 1992. He became a Fellow of the American Physical Society in 2002. He is also a Professorial Fellow in the School of Physics, Melbourne University.

From 1996 to 2002, he was a Scientific Editor with the Astrophysical Journal, and since then has been an Associate Editor with the Astrophysical Journal Letters. He is also the Chief Editor of the Theoretical Astrophysics series of books at the University of Chicago Press.

In a career that has seen him publish over 230 research papers and several books, Melia has made important contributions in High Energy Astronomy and the physics of supermassive black holes. He is especially known for his work on the Galactic center, particularly developing a theoretical understanding of the central supermassive black hole, known as Sagittarius A*. With his students and collaborators, he was the first to propose imaging this object with millimeter-interferometry, which should be feasible within a few years, proving beyond any doubt that it possesses an event horizon, as predicted by Einstein's theory of general relativity. He is also a wellrespected and popular



publicist of astronomy and science in general, delivering many lectures at public venues, including museums and planetariums. His books have won several awards of distinction, including the designation of Outstanding Academic Books by the American Library Association, and selection as world-wide astronomy books of the year by Astronomy (magazine).

Dr Melia will give a presentation centering on his most recent book *The Galactic Supermassive Black Hole*. The plethora of research on Sagittarius A* since its discovery in 1974 has long seemed an interwoven pattern of loose threads. No one has successfully synthesized this growing body of work into a manageable, coherent book for professional researchers, students, or anyone fascinated with black holes and galactic nuclei -- until now.



for an officer's position at EVAC?

Classified Ads

Orion 8" F10 SCT & SkyView Pro Equatorial Mount

Standards include: XLT coatings, 24mm Plossl and manual for mount. Extras include: Pro GoTo Upgrade Kit, v 3.20, firmware upgraded, cable and documentation manual for GoTo upgrade kit, polar axis finder and 12v battery. List price \$1999.00

This equipment is 18 months old. Used sparingly because 14.5" Dob gets preference. Reason for sale is to finance an upgrade.

Sale price \$1600.00

If you are interested in seeing this telescope contact AJ Crayon at 602-938-3277 or e-mail at acrayon@cox.net



Also, if you are thinking of a telescope for Christmas this is an ideal time to start looking and this is an ideal telescope to give.

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TeleVue Panoramic Alt-Az Mount

TelePod head is mated with a Panoramic tripod with Ash legs and central tray. This sells new for about \$600. I'll sell this one for \$275. Also have a Stellarvue 2" enhanced diagonal (with $1\frac{1}{4}$ " adapter) for \$125 and an Astrozap Baader solar filter (fits ED80 refractors) for \$25.



Peter Argenziano news@evaconline.org

www.eastvalleyastronomy.org/grco/obs.asp

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ENTURES IN ASTRONOMY & NATURE



2008 Meeting Dates

October 17 November 21 Holiday Party TBD



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!



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

OCTOBER 2008

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 4 - Deep Sky Star Party at Vekol **October 10** - Public Star Party at Riparian Preserve in Gilbert

October 10 - MCC Planetarium Gala

October 17 - General Meeting at Southeast

Regional Library in Gilbert

October 18 - Local Star Party at Boyce Thompson Arboretum

October 18 - Scottsdale Stadium Sleepover

October 23 - Alma School Star Party

October 24-25 - All-Arizona Star Party at

Farnsworth Ranch

All-Arizona Star Party October 24th - 25th Farnsworth Ranch

The observing field is located midway between Phoenix and Tucson, west of Interstate 10. The sky conditions are

reasonably good, perhaps slightly besting those of the Vekol Road site. The site offers the right combination of dark skies, good visibility and temperate nights that will encourage you to stay up well past your bedtime! There are the predictable glows from Phoenix and Tucson, but not much else to complain about. The nearby cotton fields make this another very dusty place, especially when stirred up by 50 to 100 arriving astronomers. Most of the flora is small creosote bushes, so horizons are very low. It is important to note that this site is on private land. This is a primitive



site - so if you need something you'll have to bring it with you! Porta-Potties will be available on site. Attendees are welcome to camp overnight at AASP.

To get to the site of the All-AZ Star Party: Take I-10 to Exit 200,

rizona City is the site of the annual All-Arizona Star Party. Sunland Gin Road. Take this road south (a right turn if coming from Phoenix, a left turn if coming from Tucson). Note: this is the closest place for gas and food after leaving the interstate. The paved

> road continues for 17 miles, then it turns sharply to the west (right). Continue west for 4 miles. The main road turns south (left) just past the "Silverbell Estates" sign. Continue south for 3 miles past the sign, the road veers off to the west (right). Continue on the road for another 5 miles, where it passes through a gate. Take an immediate left after the gate, and continue for 0.7 miles. Take the next right on a road that leads into an open field. Just follow the signs along the road into the observing field. If you must leave early, please park toward the north end of the field.

Likewise, if you are spending the night, park to the south.

Complete details here: http://evaconline.org/aasp.htm N 32° 27' 45.2" W 111° 43' 53.2"

East Valley Astronomy Club - 2008 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.

New Momber Change of Address New Member Dues (dues are prorated, select according to the month you are joining the club): \$\$20.00 Individual January through March \$\$22.50 Individual April through June \$\$35.00 Family January through March \$\$26.25 Family April through June \$\$37.50 Individual October through December \$\$15.00 Individual July through September \$\$37.50 Individual October through December \$\$37.50 Individual October through December \$\$17.50 Family July through September \$\$32.00 Individual \$\$35.00 Family Magazine Subscriptions (include renewal notices) \$\$38.00 Individual \$\$35.00 Family Magazine Subscriptions (include renewal notices) \$\$34.00 Astronomy \$\$33.00 Sky & Telescope Name to imprint: Payment was remitted separately using PayPal Payment was remitted separately using PayPal Please make check or money order payable to EVAC Immer: Phone:	Select one of the following:					
New Member Dues (dues are prorated, select according to the month you are joining the club): \$30.00 Individual January through March \$22.50 Individual April through Jane \$35.00 Family January through March \$22.52 Family April through Jane \$31.50 Individual July through September \$37.50 Individual October through December \$15.00 Individual July through September \$37.50 Individual October through December \$31.50 Family July through September \$33.00 Sky & Telescope \$30.00 Individual \$35.00 Family \$30.00 Individual \$35.00 Family \$30.00 Individual \$35.00 Family \$30.00 Lack (including postage) Quantity: Payment was remitted separately using PayPal Payment was remitted separately using my financial institutor online bill payment feature arme: Phone: Phone: y, State, Zip: URL: Phone: Idense of Interest (check all that apply): URL: Please describe your astronomy equipment: General Observing Cosmology Individual and second provements are required to have a liability release form (waiver) on file. F Vould you be interested in attending a beginner's workshop? Yes No Is describe provement or provement or provement or prequipment ore State provement or prequipment or pre	□ New Member	ber Renewal Change of Address				
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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.

Date



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

Please print name here

Please sign name here



Extreme Starburst by Dr. Tony Phillips

A star is born. A star is born. A star is born.

Repeat that phrase 4000 times and you start to get an idea what life is like in distant galaxy J100054+023436.

Astronomers using NASA's Spitzer Space Telescope and ground-based observatories have found that the galaxy gives birth to as many as 4000 stars a year. For comparison, in the same period of time the Milky Way produces only about 10. This makes J100054+023436 an extreme starburst galaxy.

"We call it the 'Baby Boom galaxy," says Peter Capak of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena, CA. "It is undergoing a major baby boom, producing most of its stars all at once. If our human population was produced in a similar boom, then almost all people alive today would be the same age."



The "Baby Boom" galaxy loosely resembles the galaxy shown here, called Zw II 96, in this Hubble Space Telescope image. This galaxy is only 500 million light-years away, while the Baby Boom galaxy is 12.3 billion light-years away.

Capak is lead author of a pa-

per entitled "Spectroscopic Confirmation of an Extreme Starburst at Redshift 4.547" detailing the discovery in the July 10th issue of Astrophysical Journal Letters.

The galaxy appears to be a merger, a "train wreck" of two or more galaxies crashing together. The crash is what produces the baby boom. Clouds of interstellar gas within the two galaxies press against one another and collapse to form stars, dozens to hundreds at a time.

This isn't the first time astronomers have witnessed a galaxy producing so many stars. "There are some other extreme starburst galone-off case or a common occurrence." The theory of evolution of galaxies hangs in the balance.

axies in the local universe," says Capek. But the Baby Boom galaxy is special because it is not local. It lies about 12.3 billion light years

from Earth, which means we are seeing it as it was 12.3 billion

Meanwhile... A star is born. A star is born. A star is born.

See more breathtaking Spitzer images at www.spitzer.caltech.edu/ Media/mediaimages. Kids can play the new 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.

years ago. The universe itself is no older than 14 billion years, so this galaxy is just a youngster (Capak likens it to a 6-year-old human) previously thought to be incapable of such rapid-fire star production.

> The Baby Boom galaxy poses a challenge to the Hierarchical Model of galaxy evolution favored by many astronomers. According to the Hierarchical Model, galaxies grow by merging; Add two small galaxies together, and you get a bigger galaxy. In the early years of the universe, all galaxies were small, and they correspondingly produced small bursts of star formation when they merged. "Yet in J100054+023436, we see an extreme starburst. The merging galaxies must be pretty large."

Capak and colleagues are busy looking for more Baby Boomers "to see if this is a

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

October 2008

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.

This month is a good time to find Vesta, the brightest of the asteroids (mag 6.4). It is at opposition on October 29 and should be visible all month in binoculars. See Astronomy magazine, October 2008, p. 63 for a finder chart.

On Friday, October 3, at 7:32 PM, Europa's shadow falls on Jupiter. 7 minutes later Europa itself moves from in front of the planet. The shadow remains on the planet till 10:18 PM. The great red spot tracks south of the shadow the whole time. Look 30 degrees above the south horizon with a medium (6 inch) telescope to catch the beginning of these events.

On Monday, October 6, it is first quarter phase of the Moon, so you will probably be happier observing it than deep sky objects. Near the center of the Moon is the small crater, Hyginus, with two rilles leading from it. There are numerous other rilles in the area. Just north of Hyginus is an unusual set of ridges and valleys running diagonally up and to the left (to the right in telescopes with star diagonals). Astronomy magazine, October 2008, p. 61, refers to this formation as Aries' Hoofprint (I have never seen this name anywhere else) and it is an obvious feature.

On Tuesday, October 14, at 5:39 PM (17 minutes before sunset) the full Moon rises, spoiling any chance of deep sky observing for the whole night.

telescope look almost overhead for the waning, gibbous Moon. Two stars disappear about 2:49 AM, another at 3:09 AM, another at 3:18 AM. A bright one reappears at 3:36 AM, followed by ones at 4:01 AM, 4:08 AM, and 4:10 AM. The star SAO 76183 (3h 47.0m, +24d 31'), which is likely a very close and equal double, skims along the southern edge of the Moon from about 4:05 AM to about 4:20 AM as seen from where I live. You might be able to see some interesting changes in brightness if you are in the right place.

On Sunday, October 19, at 7:25 PM, you can catch Algol at its minimum (mag 3.4). After 4 hours it will be nearly back to its maximum brightness (mag 2.1). If 11:30 PM is too late for you, check it out the next night. With your unaided eye, look 20 degrees above the northeast horizon. A finder chart with comparison magnitudes is on p. 68 of the October 2008 issue of Sky & Telescope magazine.

On Monday, October 20, the Moon is at last quarter phase and doesn't rise till 11:12 PM.

Editor's note:

Hyginus is a small lunar caldera located at the east end of the Sinus Medii. The crater rim is split by a long, linear rille that branches to the northwest and to the east-southeast for a total length of 220 kilometers. The crater is deeper than the rille, and lies at the bend where they intersect. Together the Hyginus crater and Rima Hyginus form a distinctive and prominent feature in an otherwise flat surface. Smaller craterlets can also be discerned along the length of this rille, possibly caused by a collapse of an underlying structure.

This is one of the few craters on the Moon that was not created as a result of an impact, and is instead believed to be volcanic in origin. It lacks the raised outer rim that is typical with impact craters.

On Friday, October 17, after 2:45 AM (ugh) you can watch the Moon occult some stars in the Pleiades. With a small (3 inch)



A map of 100 lunar meteors observed by astronomers at the Marshall Space Flight Center since 2005. Every impact on the map was bright enough to see with an amateur telescope.

There's more than one way to watch a meteor shower.

One, the old-fashioned way: Find a dark place with starry skies and count the meteors streaking overhead. Two, the new way: Find a dark place with starry skies and then completely ignore the meteors. Instead, watch the Moon. That's where the explosions are.

On August 9th, a pair of amateur astronomers on opposite sides of the United States did it the new way. With the Perseid meteor shower just underway, they fixed their cameras on the Moon and watched meteoroids slam into the lunar surface. Silent explosions equivalent to ~100 lbs of TNT produced flashes of light visible a quarter of a million miles away on Earth. It was a good night for "lunar Perseids."

Ready for meteor watching--the new way? NASA offers a FAQ and telescope tips to help you get started. Good hunting!

News from EVAC's Events Coordinator

We are now taking orders for EVAC polo shirts, the kind you see a number of EVAC members wearing at the monthly meeting and other events. We must place an order for at least a dozen shirts at a time from our supplier, so we typically only do this once a year. The time schedule: we took sign-ups at the September meeting and will finish taking sign-ups at the October meeting. The completed order will be placed with our supplier right after the October meeting, and the shirts will be available to be picked up at the November meeting, well in time for Christmas. Payment in advance is appreciated (cash or check only).

Shirt description: Short sleeved polo shirt with collar, Stedman by Hanes, includes pocket on the left side, EVAC logo on the right side. Available in Ash, Light Steel, Kelly Green, and Light Blue colors (Ash is a light grey color and is the most popular, light steel is a darker grey color). Made of 50% cotton, 50% polyester. Sizes: M, L, XL and XXL. Price is \$14 each.

Any ordered shirt that is not picked up by the beginning of the January meeting will be considered abandoned, and will be sold to someone else.

On November 1, 2008, EVAC members have the opportunity to participate in the Adopt-a-Highway program. Twice a year we pick up litter along both sides of our one mile of adopted highway near Florence Junction. The more participants, the faster we complete the task! Garbage bags, high visibility orange vests and a wood poker-stick are furnished, you may want to bring gloves, a hat and sunscreen. Some who don't like to bend down so much bring their own grasping tool.

Plan to meet at the Village Inn Restaurant in Apache Junction on Old West Highway (Apache Trail), 1/2 mile east of Ironwood on the south side of the street, at 7:15 am. We park and gather on the south side of the restaurant in the parking lot. We will car pool from there, leaving around 7:30 am. Or, you may meet us on highway 60 around mile 210.5 at 7:45 am (on the south-bound side of the road). There will be a short meeting to review safety issues, and we plan to start at 8:00 am. After completion, the club pays for a meal for the volunteers back at the Village Inn restaurant in Apache Junction.

A number of members have signed up at the September meeting, and the sign-up sheet will also be available at the October meeting. If you plan to attend, please sign-up or email me so we can make sure we have adequate supplies. Hope to see you there!

Randy Peterson events@evaconline.org

The Backyard Astronomer

Continued from page 2 **1998:** It had been 3 years since I bought a telescope – I was having withdrawal symptoms. So I bought a Televue 70mm Ranger (\$550) to piggyback on the C-14.

1999: I saw a Texas Nautical ad in S&T picturing a Miyauchi 20x100 (\$3200) giant binocular with 45 degree eyepieces. Oh-My-God. This unit from heaven was soon gobbling up photons for me. I'm taking them to the grave with me.

2002: I picked a Televue 85mm refractor (\$2080) that year for no good reason but have found I enjoyed using it as a grab and go scope more than the Questar [TV85 vs. Q 3.5 shootout, EVAC Newsletter December 2003]. I have the 85 on a Televue Telepod head and Bogen tripod. That same year I picked up a Swarovski 80mm spotting scope (\$1700) for birding and general terrestrial viewing. It does a pretty good job on the night sky too.

2004: A \$500 H-Alpha solar telescope from Coronado called a PST?! I'll take one!

2006: OK, time to upgrade to a GOTO. After 51 years of star hopping, I felt I deserved it. It was time to join the 21st century, save time, and wear and tear on my back. A Celestron CPC-11 (\$2800) replaced the C-14 in my observatory. The latter is now retired and resting comfortably in its cases after 29 years of faithful service. A bit less aperture, but I figure 11" of glass is enough

aperture for most purposes of casual backyard stargazing – and indeed, this has proved to be the case for me.

So we have 20 telescopes listed above, of which I still have 11. The 9 scopes that sailed off into the sunset were: 4" Dynascope, C-90, two C-5's, 4 1/4" Meade Newt, 8" F4 homemade, two Unitron 4" refractors, 6" Meade F6.3 Schmidt-Newt. Whew! That's a heck of a saga, eh? Before going down the same road I did, I might suggest you seek professional advice (as in psychiatric).

[Do you need 11 telescopes? Certainly not. But I argue 6 is the bare minimum in "How Many Telescopes Do You Need?", EVAC Newsletter, December 2001].





Spooky Hurricane Science by Dauna Coulter

There's a special room at the Marshall Space Flight Center. Researchers call it the "Anechoic Chamber" and they love to test their high-tech instruments there. Normal people think it's just plain spooky.

"In here, no one can hear you scream," says engineer Mark James as he opens the door on the surreal:



The electromagnetically quiet Anechoic Chamber at the Marshall Space Flight Center in Huntsville, Alabama.

The door creaks shut behind James and suddenly it's like someone hit the mute button. Dead silence. Pyramids on the wall seem to be closing in. The urge to scream ... hard to resist.

James just gets on with the job. He's lead engineer on a research team using this cavernous facility to test a prototype hurricane sensor called HIRAD. Short for Hurricane Imaging Radiometer, HIRAD is designed to scan large areas of ocean for microwave signals that portend storm strength and dynamics. By collecting and transmitting these data to forecasters, HIRAD could reduce property damage and even save lives.

The Anechoic Chamber is the perfect place to check HIRAD's antenna.

Weird shapes lining the chamber's walls are made of a radio-frequency damping material arranged in a pattern akin to soundproof rooms. The shapes minimize microwave reflections and eliminate electromagnetic interference.

"The electromagnetic quiet allows us to test and fully characterize the HIRAD antenna," explains James. "Lack of sound is just a weird bonus."

A microwave source at one end of the chamber sends signals to the HIRAD antenna at the other end. In this way, engineers can explore the antenna's beam pattern to check that it meets the requirements of the mission ahead.

Using microwaves, "HIRAD will be able to map out wind speeds on the ocean's surface--in particular the hurricane strength within the eye wall and elsewhere," says Tim Miller, HIRAD principal investigator at the National Space Science and Technology Center in Huntsville, Alabama. "We can also determine how heavy the rain is and the temperature of the ocean surface, more indicators of hurricane characteristics."

Because of its design, HIRAD can make observations over a wider swath of area than instruments currently used by NOAA. And by using electronic rather than mechanical means to scan and create a two-dimensional image of the storm's dynamics, HIRAD

can operate on less power than current wind measuring instruments. It's also smaller, lighter, and relatively inexpensive to build.

"HIRAD's observations will not only give weather officials more and better real-time information on storm strength, but it will also help them determine how the storm will develop and where it will go," says Miller. "All of this adds up to more advanced warnings to the public."

How is HIRAD doing so far in the "bat cave" testing?

"We're still reviewing our test data, but so far HIRAD is passing with flying colors," says Robbie Hood of the MSFC, former principal investigator for the project and still intimately involved in its development.

The next step, she says, "is to build the real thing. This is just a test unit – a laboratory prototype. Ultimately, HI-RAD will be more compact and lighter weight than the unit we're testing now."

The team hopes to have HIRAD ready to fly checkout tests

onboard an aircraft by fall 2009, and ready for its first hurricane experiment in 2010. HIRAD will have to compete with other candidate instruments for the hurricane experiment.

The whole team feels confident that their instrument is going to succeed. "We've got top-notch personnel working long hours to make it happen," says Miller. "We all know that HIRAD is a valuable instrument, and we want to place it in the hands of weather officials so it can do its work -- saving lives."

The trick, says James with a smile, "is not getting locked in the bat cave." What?

Engineer David Simmons adjusts the HIRAD antenna in the MSFC Anechoic Chamber.

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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Zeep Looking Up!

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