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Weather, Schmeather…..

Bob Taylor

Even with a forecast less than desirable, about twenty folks attended the star party at the Fort last month. Thursday night was clear with the typical Fort breeze that makes you setup your rig close to the ruins wall. It was mostly a social evening, but we did actually view quite a few objects, including the comet that was just off Polaris. That first night at the Fort is always tough after a long drive, so most of us turned in early.

Our Friday jaunt into Junction to “perform” for the elementary school kids was a blast! I’m not sure if it’s a “Friday after lunch boredom thing” or a “city folk are a’ comin’ “thing but we rocked the house!! Lisa led with the solar system brief (always a hit) and David had a presentation complete with a slide show. We entertained bunches of questions, some really good! There always seems to be a theme to the questions; sometimes it’s black holes, other times its how many or how big. This time it was “is the Sun gonna burn out”? My simple answer of “yes” wasn’t good enough. Now the raging torrent of “when”, “how” and “why” began. Assuring the kids that their spring break plans would not be affected by the Sun’s eventual demise, I think they got the big picture. Anyway, we had a great time there and the staff was most appreciative.

Friday night was a bit too cloudy for telescope astronomy, although we could easily make out the constellations. The ritual “grill off” was a hoot! Lots of food and nectar about the fire pit. Good time to catch up with Becky and Shane, who told the story of the zoo of animals they have encountered in and under their home in New Mexico.

“Elvis” sings to Bob
image by Becky Ramotowski

Buddy tends the chicken for the Saturday BBQ.
Image by Ken Lester

Saturday brought rain. It was doubtful that it would let up either. Buddy provided us with what I do believe was his best barbeque ever! Even with the bad weather, Buddy really appreciated the fact that we came all that way on the slim chance we would have a sky to show the public. It just didn’t happen. Dinner time found fourteen of us at the Outback, along with some very friendly local folks. One fella felt the need to croon a few Elvis numbers to us on a rather personal level, complete with huggin’ and such. After unsuccessfully swooning Beatrice and Connie, he felt the need to wrap his burly arms around my neck and splay out a rendition of “Love me Tender”. What could I do? I hugged him back and tried not to offend him (he was much bigger than me). I’ll be appointing a “Traveling Sergeant of Arms” at the next meeting.

It was a fun trip despite the weather. I can’t wait till October!

Fort McKavett Spring Star Party

Ken Lester

Image by Ken Lester

Twice a year, JSCAS members trek out to the hill country to spend three days under dark skies at Fort McKavett State Historical Site. The trip to the fort is more than just a chance to observe under some really dark skies. It represents a chance to get away from the stress and hurried city life. It also gives us the opportunity to visit with old friends who have moved away and travel great distances to meet us at the fort. Finally, it allows us to share our knowledge and love of astronomy with the children and adults who live in the communities near the fort.

This spring's event, scheduled in early March because of conflicting events at the fort, met with some poor weather conditions. The weather forecasts leading up to the trip got progressively worse. By the time Wednesday arrived, the predictions made it appear that there wouldn't be any chance for observing. Despite these weather predictions, 14 members decided that a trip to the fort would be worth it.

As it turned out, Thursday's clouds cleared off at dark and the seeing was fairly decent for visual observing. The winds were gusting, however, preventing CCD and film imaging. Those who arrived on Friday were no doubt disappointed that they had missed the one chance at viewing. On Friday night, only the very brightest of stars shone through the high clouds. Saturday night a light rain fell.

Junction Elementary School Presentations — Images by David Haviland and Ken Lester

Despite the poor weather, there was other fun to be had.

Friday at noon, Bob Taylor, the Havilands and the Lesters had lunch at La Familia in Junction. Afterwards, we went to Junction Elementary where we gave an astronomy presentation to an auditorium full of students (grades K-5). We literally played to a packed house. Lisa Lester presented Triple Nickel's scale of the solar system tour. This time the brief was accompanied by a PowerPoint presentation of recent images of each planet and several of their moons. After the solar system briefing, Lisa took the K-2 children out and told a story of how ancient Indian lore explained how the Earth came to be. The older students were then given a comparison of the Earth and Moon by David Haviland. Next, Bob Taylor and I discussed the types

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Images by David Haviland

of telescopes. Finally, Bob, David and I fielded questions from the students. For the most part, the questions asked were very good. It never stops surprising me at how knowledgeable some of the kids are about astronomy and current events. Special thanks go to Dr. Stephanie Shipp at the Lunar and Planetary Institute for her assistance with materials on the Earth-Moon comparison and for donating Apollo-Lunar Landing Site posters for every student.

On Friday evening, we held our "bring your own" cookout. Shane and Bob had two fire pits going and the group cooked their food and feasted while passing around side dishes and some adult beverages. Park Superintendent Buddy Garza and his family joined in the fun. Everyone had a great time, eating, drinking and visiting.

Image by Ken Lester

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Our spring star party was widely advertised to the local communities. We even made the front page of *The Menard News and Messenger*.

The Menard News and Messenger

50c per copy

THURSDAY MARCH 3, 2005

MENARD COUNTY, TX 76859

Vol. 70 No. 18

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The World's Only Paper Primarily Featuring News And Pictures About Menard

Star Party Saturday, Weather Permitting

Big Events At Fort McKavett On Two Weekends

The first event open to the public will be the Star Party this Saturday, March 5th.

Fort McKavett and Johnson Space Center Astronomical Society will host the star party with lectures beginning at 4:00 p.m. Viewing of the stars will begin at dusk.

Fort McKavett has been touted as an excellent site for stargazing due to its location and the lack of interference from artificial lighting.

Regular park entrance fees will apply Saturday for the JSCAS-sponsored star party and participants are reminded to take flashlights.

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On Saturday, Buddy Garza served up a BBQ feast consisting of brisket, chicken, sausage, beans, potato salad, salad, tea, cake, and chips with salsa, hand prepared the old fashioned way by Alfredo, one of the park's rangers. Our thanks go to the Friends of the Fort and the park staff and their families for keeping us so well fed.

Image by Ken Lester

After the BBQ we took our group picture. We had to do it inside the school house since it had begun to rain lightly. After the group picture, some of us ventured out into the rain for a hike down to the springs. The park has put in a new hiking trail, which provides an alternate way to get to the springs. There are nice signs pointing out the flora along the way. Check it out on your next trip to the fort.

Saturday night, those who decided to stay were joined by Buddy Garza and his family for dinner at the Outback Burger Barn. Kiwi, the owner, appeared to be the only employee on duty when we arrived. In all, we had about 15 in our party. There were a couple of tables of locals already there when we arrived. Kiwi took our orders and warned us in advance that it might take a while to get our food. While we waited, the "Elvis impersonator" floor show started. No, it wasn't something the Burger Barn arranged. One of the local (Eldorado) ranchers who had slightly too much of whatever he was drinking, began serenading all the ladies (and Bob) in the place with Elvis tunes. While he was harmless, the ladies were a little uncomfortable while he snuggled in close with his "love Me Tenders". When he started dancing on the table, we all feared for his life. We were very relieved when he got down and then quit bellowing out his tunes.

"Elvis" sings — Image by Becky Ramotowski

As I stated earlier, there are more reasons to come to the fort besides the stars. We had some great fun, educated a lot of kids, ate to our hearts' delight, and lowered our blood pressure significantly. A poor weather day at the fort is way better than a normal day back home.

At our Saturday lunch, Buddy Garza thanked all of us who came out to the fort when the weather prospects were so bleak. He thanked us for our dedicated support of the fort and the surrounding communities.

Our next trip to the fort promises to be great. See you there September 29th—October 1st.

Buddy and his family are helping a local rancher out by taking in three of her baby goats. They are also tending to 2 rabbits. Our group was invited to help hand feed the goats. Looks like Pat McLeod is thinking about adopting a goat.

Personal Thoughts About the Party at the Fort!

Connie Haviland

Every October since I joined JSCAS, I have attended the October gathering at Fort McKavett. I have been there when the weather was cold and I needed to bundle up and keep warm while I explored the most beautiful skies I have ever seen. Then there has been the time I went back home with a sunburned face, because the weather was comfortable and sunny with no humidity. Then, in March 2003, I decided to attend the gathering in the early spring. After all, the fort had a beautiful record of nice skies, decent weather and the great exploration of our universe. But that trip would not be like the rest of my trips to Fort Mac. I froze my behind off. What was advertised as a "light freeze" turned south and it had gone down to 21 degrees before they calculated the wind chill factor. I was never going to go in March again.

Well, never say never. This I have learned. This past Christmas, Dave and I had discussed going to Fort Mac and I told him that I would prefer to have a root canal. I was never going to go and subject my body to the freezing environment I had experienced before. With no electricity, how was I going to plug in my electric heater? How was the electric blanket going to work? NOPE, I was not going to go. Well, Dave and I bantered back and forth over the past year about getting a trailer and by late February, we had one! The thought of not having electricity wasn't what I wanted on its maiden voyage; but with an encouraging note from Ken, our enthusiasm went sky high.

We packed the trailer on Wednesday night and I went to bed knowing that no matter what, we were going to have a good time! Ken had told us we could park by the maintenance building and we could use the electricity there. I went to school, Dave had to give a lecture. Afterward we all met up and headed for Fort Mac. We had to make our usual stop at Love's Travel Center for gas and refreshments. It is a tradition. Dave and I never pass it by whenever we are on I-10 West. And the dogs, Buddy and Holly, were so happy we did. Besides getting to "take care of business", they got to help us eat the "junk food". We continued to drive and made the mistake of taking the Anderson Loop around San Antonio.

(L to R) Bob, Dave, John, Connie, and Shane — Image by Ken Lester

Well, we couldn't have an uneventful trip could we? Just after turning off for the Anderson Loop around San Antonio, we developed a flat tire on the trailer. Oh no, this was not on the trip schedule. With trailer in tow, David grossly over estimated how short the off-ramp was from I-10 to the Anderson Loop and we hit something hard on the left side. We made it up to Kitty Hawk Lane where a kind driver suggested that we pull over. We ended up at a TigerMart with a dead tire. Thank goodness for AAA. (No Bob…not AA) We had to wait practically an hour and then the guy wasn't sure he would be able to change the tire without tipping the trailer. I say, if you can lift a 28' trailer, attached to a Sequoia filled with 3 scopes and their counter-weights, you have lifted that trailer way too high. But, after some complaining and encouragement from Dave and John, the guy got the tire changed and we were back on the road again.

We took on the last bit of gas at Junction and made the Fort McKavett exit by dark. We drove right down the center of the road to the Fort. After counting 20+ deer and various other animals while creeping up the road to the fort, we arrived safe and sound. We pulled in and got ourselves

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situated around 10 pm.

John captures the moment — Image by Ken Lester

It was a beautiful clear night and there were several people out star-hopping. The Milky Way was clear and as always, we were not disappointed in the skies. We decided that since we had a late start and had to deal with some things in Houston, we chose to just get the camp set up and call it a night on Thursday. The temperature that night was reasonable and we woke to somewhat cloudy skies.

Dave, Ken, Lisa, Bob, John and I drove into Junction and had lunch at a favorite Mexican restaurant. Then John and I sent them on their way to do their presentation for the elementary school. I will leave that for Dave, Bob, Ken and Lisa to talk about. John and I ran around town and got a few things for the camper. When our "community service" group returned, they were so excited to let us know that the kiddos had a wonderful time. The school wants us back next year and we may be doing two schools with two groups in October. I will leave that to Lisa.

Friday evening was marginal at best but sucker holes were all over. The skies did open, down to about 30° above the horizon and just when Dave was thinking about pulling out the 6" scope, the skies started filling back up. Now, you know our group; that didn't stop us from having some fun. We sat around the fire that Shane, our expert fire-builder, started for us. Way to go Shane, it was great! Everyone visited and watched the skies hoping to see a clearing, but it didn't come. So, we gathered our own little group and headed back to the trailer.


Hey Dave, you're late! Image by Ken Lester

The next day was our big gathering with Buddy (not our puppy dog) and the BBQ. As always, Buddy does a great job. The food was great, the company was wonderful and conversation and jokes floated through-out the school house non-stop. Then it was time for the group picture. Hey! Who forgot the club banner? Well.. I am not telling, but we have some really ingenious people in our group. We improvised and made our own banner. A *human banner*. Just as we were getting ready to take the pictures, it started to rain, but we were able to do the photo shoot without any problems. You should have seen those flashbulbs flashing. They were going off left and right, right and left. It would make anyone feel like a celebrity.

As always, we were stuffed after Buddy's BBQ gathering, so we went back to the camper and took in some movies. Again, the clouds covered the sky, but that didn't keep us from having a gathering of great minds. Everyone headed to the local Aussie's establishment, The Outback, but not THAT "Outback". What a gathering it was! "Elvis", a rather lacquered up local resident, was already there when we arrived and serenaded several of us women. He even got up on a rather shaky table and moved "those" hips and laughter filled that entire place. When "Elvis" wasn't entertaining us, Buddy's two children kept our end of the table occupied, even Bob. We were there for some time

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and when we got up to leave, the sky opened up. Yes, it rained. Yet, after sharing time with our friends and having so many laughs, it didn't matter.

The next day we woke up to cloudy skies, but at least I didn't freeze my behind off this time. I was warm and comfy the entire night. The weather may have been cloudy with some rain, but it was not miserable. We packed up our things, coordinated our leave/trip with Ken and Lisa and drove into Kerrville and had lunch together at our favorite "stop after the fort" restaurant, Cracker Barrel. We talked about the weekend and various different activities and when we were through, said our goodbyes and promised to see each other soon. We then put gas in the truck and headed East for Houston.

As we drove home, I thought about how the weekend went. I thought about saying I was never going to make another March trip to the Fort. I went over my memories of the weekend and thought about the skies being cloudy and not being able to take out my scope. Sure, I didn't get to work on my Messier list, but I did get to have the weekend that I always have when I am at the Fort. Peace, quiet, no stress and good friends. I came back rested and happy, knowing that I will not say, "Never", again.

Thanks everyone who was able to make it to the fort and share the weekend with my star-hopping partner, Dave, and my son, John. I can't wait to make more memories at the Fort!

Star Party News

Lisa Lester

Our next star party will be at the Haak Winery on April 9th. That's the day after our April meeting. Electricity will be provided. Our first Challenger 7 star party is just a week later, on April 16th. Unfortunately, I will miss the Haak Winery star party. I'll be in Panama, hopefully observing the annular eclipse with several other club members. Below is the schedule of JSCAS star parties for 2005.

Event	Date	Sun Set	Moon			Jupiter		Saturn		Mars		Venus	
			Illum.	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
2005													
Moody Gardens	Feb 12	18:23	22	09:51	22:43	22:32	10:07	15:42	05:40	04:26	14:28	06:53	17:28
Fort McKavett	Mar 3 to 6	18:38	46	01:20	11:26	21:12	08:49	14:23	04:22	04:08	14:15	06:52	18:09
Haak Winery	Apr 9	20:02	2	07:45	21:11	19:27	07:12	12:57	02:57	04:19	14:55	07:32	20:17
Challenger 7	Apr 16	20:07	54	12:59	02:54	18:51	06:42	12:31	02:30	04:08	14:52	07:29	20:30
Moody Gardens	Aug 13	20:22	60	15:00	00:31	11:18	23:01	05:43	19:29	00:11	13:12	09:50	22:08
Challenger 7	Sep 10	19:50	45	13:56	23:57	09:51	21:25	04:08	17:47	22:56	12:14	10:34	21:44
Fort McKavett	Sep 29 to Oct 2	19:25	11	04:01	17:47	08:55	20:21	03:03	16:38	21:50	11:14	11:04	21:32
Haak Winery	Nov 5	19:18	7	09:41	20:33	08:37	20:01	02:41	16:16	21:25	10:51	11:14	21:30

LPI Family Space Day

Matt Hommel

Ed and Eleta Malewitz with their PST

The theme for Family Space Day, March 2005, was the Sun - Earth Relationship. Kids got to make Sun dials that really worked as well as a model of the Sun and four earths, each showing a different season. This showed the kids why the seasons change and why it is winter in the north when it is summer in the southern hemisphere. As always there was lots of glitter and coloring. Additionally, this month the LPI folks had a presentation in the auditorium of Native American Folklore regarding the formation of the Sun, followed by the real explanation of how the Sun formed.

A big thank you goes out to Ed and Eleta Malewitz, who were kind enough to bring out their H-Alpha telescope. Despite almost solid cloud cover, we did get a few moments of solar observing. There are two types of Coronado PSTs as I understand it, good ones and great ones. Theirs is a great one. The flares were obvious, and the surface of the sun was visible as well, when the clouds would give way. I would love a look through this scope on a truly sunny day. Perhaps we can convince them to bring it next month.

Attendance was good and everyone had a blast. Another big thank you to the folks at the LPI for dedicating time, effort and money to this fun, educational, and FREE activity for the whole family.

'Till Next Month

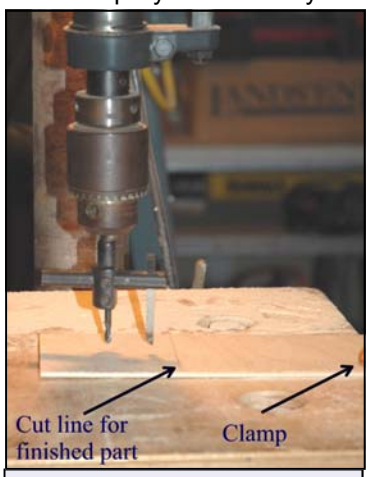
All images taken by Matt and Piper Hommel.

Building A Solar Filter

Ken Lester

After years of listening to Dr. Paul Maley talk about the Ring of Fire solar eclipse tours, I am excited to report that I will be attending my first, this April's tour to Panama. This eclipse starts out as a total eclipse well over the Pacific Ocean. By the time it reaches Panama, it will have become annular, which should produce some stunning Bailey's Beads. My goal for the trip is to take still images of the ring of fire.

I will be using a Nikon D-70 digital camera with a 80 ~ 300 mm zoom lens. This lens has an effective focal length of 120 ~ 450 mm on the D-70. I have already experimented with this camera/ lens setup by successfully taking images of the full Moon, which has the same angular diameter as the Sun. At the maximum focal length of the lens, I will be able to capture an image of the Sun that occupies about 10% of the available frame size. To actually image the Sun, I had to obtain a white light solar filter to cover the lens. To my knowledge, no one makes a solar filter that screws onto this lens. My only option was to build a filter myself.



A circle cutting tool was used to cut the holes. This tool requires a drill press and the parts must be securely clamped to the drill press table. Since the holes were nearly as large as the diameter of the parts, the parts were cut to their final dimension after the holes were drilled.

Astro-Physics distributes a foil based safety film (Baader AstroSolar Film), whose reflective property is 99.999%. This produces a view of the Sun with extremely good contrast and an almost neutral color. This foil is perfect for making your own solar filters.

I built my filter cell out of wood, using scrap materials from other projects. I selected a piece of ¾" red oak plywood to use as a base for my filter cell. Using a drill press and a circle cutter, I cut a hole very slightly larger in diameter than the end of my lens. I then used my table saw to cut the plywood to it's 3¼" square final dimensions with the hole centered in the square.

Next I repeated the process to build two 3¼" square parts out of ⅛" basswood, which can be found in most hobby stores. The diameter of the holes in the basswood parts were slightly smaller than the outside diameter of my lens, but large enough to not cover the optics. The Baader solar film will be sandwiched between the two pieces of basswood. Since the diameter of the hole in the basswood is smaller than the lens barrel, the lens will not actually touch the solar film when the filter cell is attached to the lens.

Stacking the three pieces together, I then drilled holes in each corner of the rectangle. Screws will secure the three pieces together.

Cross section diagram of the filter cell showing taper of lens barrel, retaining screws, and the assembly of the three wood parts.

To prevent the filter cell from accidentally falling off the lens, I installed two #6 nylon screws to the base of the filter cell. This is where I got lucky. The lens barrel flairs out near the end of the lens (see diagram). This allows the nylon screws to securely attach the filter cell to the lens with absolutely no chance of it coming off. The installation of the nylon screws consisted of drilling holes in the base then tapping the holes to cut threads in the wood.

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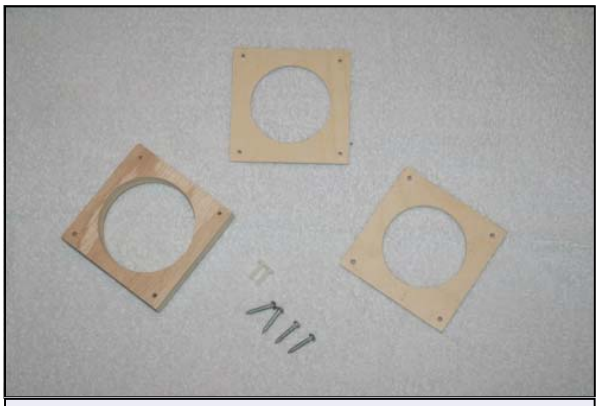
I sanded the three wooden parts and painted them flat black. I test assembled the pieces without the solar film to ensure a proper fit.

The final step was to add the solar film. I followed the installation instructions that came with the solar film, at least in principle. I placed small strips of double sided tape around the hole of one of the ⅛" basswood parts, avoiding the pilot holes in the corners. I cut a small piece of solar film, slightly larger than the filter cell, from the roll and carefully laid it on a soft cotton cloth. I then took the filter board with the double sided tape and carefully laid it over the solar film so the solar film will stick to the double sided tape.



These are the main components of the filter cell before painting (solar film not shown).

With the solar film now taped in place, I trimmed the film to the size of the filter cell. I also cut off the corners of the film so the screws that were used to assemble the completed unit would not have to penetrate the solar film. Cutting the solar film was more of a problem than I anticipated. It is quite tough. A very sharp pair of scissors is required to do a good job of cutting.

With the filter cell assembled, I just had to wait for a sunny day to test it out. Fortunately, I didn't have to wait but a day or two before the clouds cleared and the Sun shone brightly. The first thing I did was to check to see if there were any pin holes in the filter. Once I was satisfied the filter was safe, I mounted it to my lens and shot some test images. Although the image of the Sun is only about 10% of the available frame, when I enlarged the image, I could see some small sun spots.

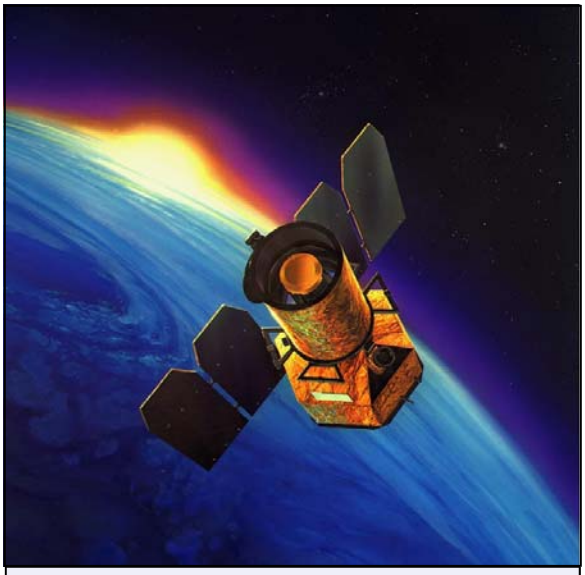
To store my filter cell, I place it in a small rectangular plastic food storage container. This should keep it from being damaged in my camera case.

Hopefully I will have some great images of the annular eclipse in Panama to share next month.

This is my test image. The image has been cropped and the brightness and contrast adjusted slightly. Notice the small sun spots.

Aging Universe May Still Be Spawning Massive Galaxies

Full press release: GALEX-2004-01



Artist's conception of GALEX.

NASA's Galaxy Evolution Explorer has spotted what appear to be massive "baby" galaxies in our corner of the universe. Previously, astronomers thought the universe's birth rate had dramatically declined and only small galaxies were forming.

"We knew there were really massive young galaxies eons ago, but we thought they had all matured into older ones more like our Milky Way. If these galaxies are indeed newly formed, then this implies parts of the universe are still hotbeds of galaxy birth," said Dr. Chris Martin. He is principal investigator for the Galaxy Evolution Explorer at the California Institute of Technology, Pasadena, Calif., and co-author of the study.

Martin and colleagues, led by Dr. Tim Heckman of Johns Hopkins University, Baltimore, Md., unearthed three-dozen bright, compact galaxies that greatly resemble the youthful galaxies of more than 10 billions years ago. These new galaxies are relatively close to us, ranging from two to four billion light-years away. They may be as young as 100 million to one billion years old. The Milky Way is approximately 10 billion years old.

The recent discovery suggests our aging universe is still alive with youth. It also offers astronomers their first, close-up glimpse at what our galaxy probably looked like when it was in its infancy.

"Now we can study the ancestors to galaxies much like our Milky Way in much more detail than ever before," Heckman said. "It's like finding a living fossil in your own backyard. We thought this type of galaxy had gone extinct, but in fact newborn galaxies are alive and well in the universe," he added.

The new discoveries are of a type called ultraviolet luminous galaxies. They were discovered after the Galaxy Evolution Explorer scanned a large portion of the sky with its highly sensitive ultraviolet light detectors. Since young stars pack most of their light into ultraviolet wavelengths, young galaxies appear to the spacecraft like diamonds in a field of stones. Astronomers mined for these rare gems before, but missed them because they weren't able to examine a large enough slice of the sky.

"The Galaxy Evolution Explorer surveyed thousands of galaxies before finding these few dozen ultraviolet-bright ones," said Dr. Michael Rich, a co-author of the study from the University of California, Los Angeles.

The newfound galaxies are about 10 times as bright in ultraviolet wavelengths as the Milky Way. This indicates they are teeming with violent star-forming regions and exploding supernova, which are characteristics of youth.

When our universe was young, massive galaxies were regularly bursting into existence. Over time,

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the universe bore fewer and fewer galactic progeny, and its newborn galaxies grew up into ones that look like our own. Until now, astronomers thought they had seen the last of these giant babies.

The results will be published in an upcoming special issue of Astrophysical Journal Letters, along with several other papers describing new results from the Galaxy Evolution Explorer.

The Galaxy Evolution Explorer was launched on April 28, 2003. Its mission is to study the shape, brightness, size and distance of galaxies across 10 billion years of cosmic history. The Explorer's 50-centimeter-diameter (19.7-inch) telescope sweeps the skies in search of ultraviolet-light sources.

Caltech leads the Galaxy Evolution Explorer mission and is responsible for science operations and data analysis. NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the mission and built the science instrument. The mission was developed under NASA's Explorers Program managed by the Goddard Space Flight Center, Greenbelt, Md. South Korea and France are the international partners in the mission.

For images and information about the Galaxy Evolution Explorer on the Internet, visit http://www.nasa.gov/centers/jpl/missions/galex.html. For information about NASA and agency programs on the Internet, visit http://www.nasa.gov.

NASA's Spitzer Space Telescope Exposes Dusty Galactic Hideouts

For Release: March 1, 2005

How do you hide something as big and bright as a galaxy? You smother it in cosmic dust. NASA's Spitzer Space Telescope saw through such dust to uncover a hidden population of monstrously bright galaxies approximately 11 billion light-years away.

Artist's conception, NASA/JPL

These strange galaxies are among the most luminous in the universe, shining with the equivalent light of 10 trillion suns. But, they are so far away and so drenched in dust, it took Spitzer's highly sensitive infrared eyes to find them.

"We are seeing galaxies that are essentially invisible," said Dr. Dan Weedman of Cornell University, Ithaca, N.Y., co-author of the study detailing the discovery, published in today's issue of the Astrophysical Journal Letters. "Past infrared missions hinted at the presence of similarly dusty galaxies over 20 years ago, but those galaxies were closer. We had to wait for Spitzer to peer far enough into the distant universe to find these."

Where is all this dust coming from? The answer is not quite clear. Dust is churned out by stars, but it is not known how the dust wound up sprinkled all around the galaxies. Another mystery is the exceptional brightness of the galaxies. Astronomers speculate that a new breed of unusually dusty quasars, the most luminous objects in the universe, may be lurking inside. Quasars are like giant light bulbs at the centers of galaxies, powered by huge black holes.

Astronomers would also like to determine whether dusty, bright galaxies like these eventually evolved into fainter, less murky ones like our own Milky Way. "It's possible stars like our Sun grew up in dustier, brighter neighborhoods, but we really don't know. By studying these galaxies, we'll get

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a better idea of our own galaxy's history," said Cornell's Dr. James Houck, lead author of the study.

The Cornell-led team first scanned a portion of the night sky for signs of invisible galaxies using an instrument on Spitzer called the multi-band imaging photometer. The team then compared the thousands of galaxies seen in this infrared data to the deepest available ground-based optical images of the same region, obtained by the National Optical Astronomy Observatory Deep Wide-Field Survey. This led to identification of 31 galaxies that can be seen only by Spitzer. "This large area took us many months to survey from the ground," said Dr. Buell Jannuzi, co-principal investigator for the Deep Wide-Field Survey, "so the dusty galaxies Spitzer found truly are needles in a cosmic haystack."

Further observations using Spitzer's infrared spectrograph revealed the presence of silicate dust in 17 of these 31 galaxies. Silicate dust grains are planetary building blocks like sand, only smaller. This is the furthest back in time that silicate dust has been detected around a galaxy. "Finding silicate dust at this very early epoch is important for understanding when planetary systems like our own arose in the evolution of galaxies," said Dr. Thomas Soifer, study co-author, director of the Spitzer Science Center, Pasadena, Calif., and professor of physics at the California Institute of Technology, also in Pasadena.

This silicate dust also helped astronomers determine how far away the galaxies are from Earth. "We can break apart the light from a distant galaxy using a spectrograph, but only if we see a recognizable signature from a mineral like silicate, can we figure out the distance to that galaxy," Soifer said.

In this case, the galaxies were dated back to a time when the universe was only three billion years old, less than one-quarter of its present age of 13.5 billion years. Galaxies similar to these in dustiness, but much closer to Earth, were first hinted at in 1983 via observations made by the joint NASA-European Infrared Astronomical Satellite. Later, the European Space Agency's Infrared Space Observatory faintly recorded comparable, nearby objects. Spitzer's improved sensitivity, 100 times greater than past missions, has allowed the telescope to seek out a variety of dusty galaxies at great distances, including this recent batch of exceptionally dusty and bright ones.

The National Optical Astronomy Observatory Deep Wide-Field Survey used the National Science Foundation's 4-meter (13-foot) telescope at Kitt Peak National Observatory, located southwest of Tucson, Ariz.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington, D.C. Science operations are conducted at the Spitzer Science Center. JPL is a division of Caltech. The infrared spectrograph was built by Ball Aerospace Corporation, Boulder, Colo., and Cornell; its development was led by Houck. The multi-band imaging photometer was built by Ball Aerospace Corporation, the University of Arizona, Tucson, Ariz., and Boeing North American, Canoga Park, Calif.; its development was led by Dr. George Rieke of the University of Arizona.

The Infrared Astronomical Satellite was a joint effort between NASA, the Science and Engineering Research Council, United Kingdom and the Netherlands Agency for Aerospace Programmes, the Netherlands.

Artist's conceptions, images and additional information about the Spitzer Space Telescope are available at http://www.spitzer.caltech.edu.

Whitney Clavin (818) 354-4673
Jet Propulsion Laboratory, Pasadena, Calif. jpl2005-036 ssc2005-08

Chandra Probes High-Voltage Auroras on Jupiter

March 2, 2005
CXC RELEASE: 05-04

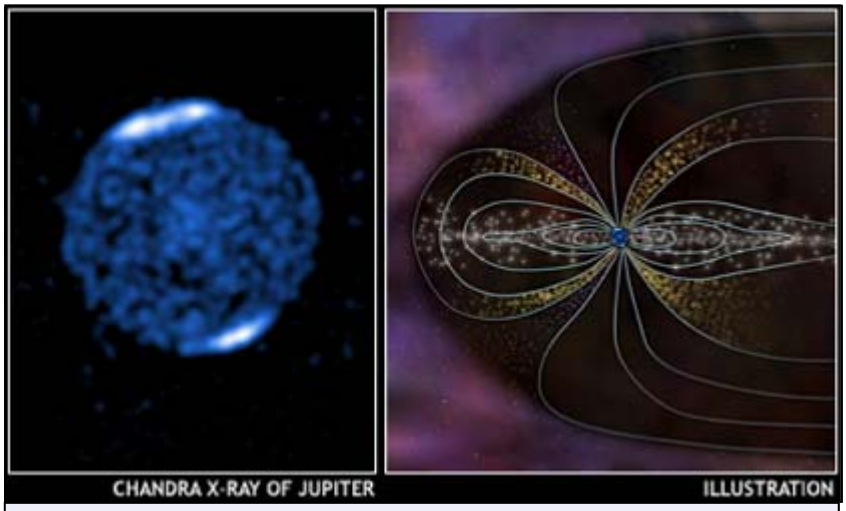
Scientists have obtained new insight into the unique power source for many of Jupiter's auroras, the most spectacular and active auroras in the Solar System. Extended monitoring of the giant planet with NASA's Chandra X-ray Observatory detected the presence of highly charged particles crashing into the atmosphere above its poles.

X-ray spectra measured by Chandra showed that the auroral activity was produced by ions of oxygen and other elements that were stripped of most of their electrons. This implies that these particles were accelerated to high energies in a multimillion-volt environment above the planet's poles. The presence of these energetic ions indicates that the cause of many of Jupiter's auroras is different from auroras produced on Earth or Saturn.

"Spacecraft have not explored the region above the poles of Jupiter, so X-ray observations provide one of the few ways to probe that environment," said Ron Elsner of the NASA Marshall Space Flight Center in Huntsville, Alabama, and lead author on a recently published paper describing these results in the Journal for Geophysical Research. "These results will help scientists to understand the mechanism for the power output from Jupiter's auroras, which are a thousand times more powerful than those on Earth."

Electric voltages of about 10 million volts, and currents of 10 million amps - a hundred times greater than the most powerful lightning bolts - are required to explain the X-ray observations. These voltages would also explain the radio emission from energetic electrons observed near Jupiter by the Ulysses spacecraft.

On Earth, auroras are triggered by solar storms of energetic particles, which disturb Earth's magnetic field. Gusts of particles from the Sun can also produce auroras on Jupiter, but unlike Earth, Jupiter has another way of producing auroras. Jupiter's rapid rotation, intense magnetic field, and an abundant source of particles from its volcanically active moon, Io, create a huge reservoir of electrons and ions. These charged particles, trapped in Jupiter's magnetic field, are continually accelerated down into the atmosphere above the polar regions where they collide with gases to produce the aurora, which are almost always active on Jupiter.



Credit: X-ray: NASA/CXC/MSFC/R.Elsner et al.; Illustration: CXC/M.Weiss

If the particles responsible for the aurora came from the Sun, they should have been accompanied by large number of protons, which would have produced an intense ultraviolet aurora. Hubble ultraviolet observations made during the Chandra monitoring period showed relatively weak ultraviolet flaring. The combined Chandra and Hubble data indicate that this auroral activity was caused by the acceleration of charged ions of oxygen

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and other elements trapped in the polar magnetic field high above Jupiter's atmosphere.

Chandra observed Jupiter in February 2003 for four rotations of the planet (approximately 40 hours) during intense auroral activity. These Chandra observations, taken with its Advanced CCD Imaging Spectrometer, were accompanied by one-and-a-half hours of Hubble Space Telescope observations at ultraviolet wavelengths.

The research team also included Noe Lugaz, Hunter Waite, and Tariq Majeed (University of Michigan, Ann Arbor), Thomas Cravens (University of Kansas, Lawrence), Randy Gladstone (Southwest Research Institute, San Antonio, Texas), Peter Ford (Massachusetts Institute of Technology, Cambridge), Denis Grodent (University of Liege, Belgium), Anil Bhardwaj (Marshall Space Flight Center) and Robert MacDowell and Michael Desch (Goddard Space Flight Center, Greenbelt, Md.)

NASA's Marshall Space Flight Center, Huntsville, Ala., manages the Chandra program for NASA's Office of Space Science, Washington. Northrop Grumman of Redondo Beach, Calif., formerly TRW, Inc., was the prime development contractor for the observatory. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass.

Additional information and images are available at: http://chandra.harvard.edu and http://chandra.nasa.gov

Houston Area Astronomy Clubs

Brazosport Astronomy Club
Meets the Third Tuesday of the month, 7:45 p.m.
At the Planetarium
400 College Drive
Clute, Texas
For more information, contact Judi James at the Planetarium
979-265-3376

Fort Bend Astronomy Club http://www.fbac.org/
Meets the third Friday of the month, 7:00 p.m.
First Colony Conference Center
3232 Austin Pkwy
Sugar Land, Texas

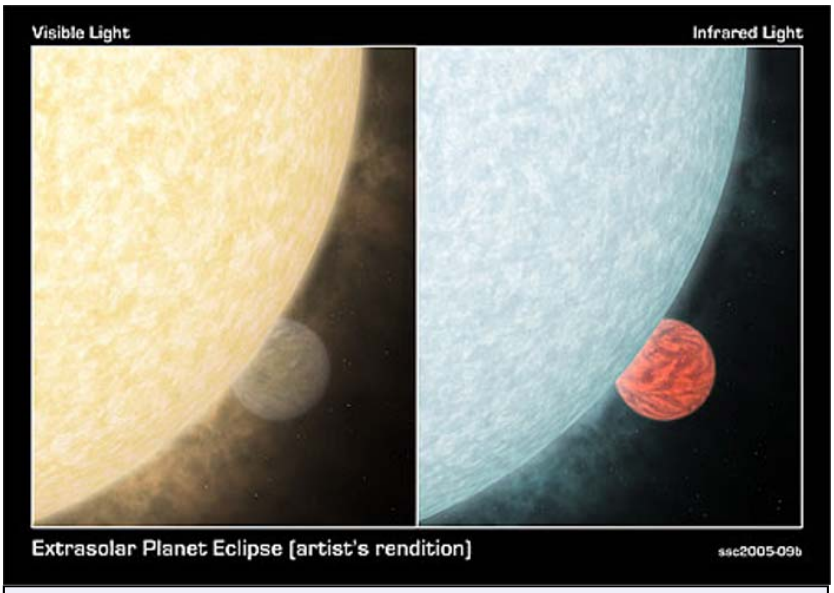
Houston Astronomical Society http://spacibm.rice.edu/~has/
Meets the first Friday of the month, 8:00 p.m.
University of Houston, University Park
Science and Research Building, room 117

North Houston Astronomy Club http://www.astronomyclub.org/
Meets the fourth Friday of the month, 7:30 p.m.
In the Teaching Theater at Kingwood College
20000 Kingwood Drive
Kingwood, Texas

NASA's Spitzer Marks Beginning of New Age of Planetary Science

For Release: March 22, 2005 jpl2005-050 ssc2005-09

NASA's Spitzer Space Telescope has for the first time captured the light from two known planets orbiting stars other than our Sun. The findings mark the beginning of a new age of planetary science, in which "extrasolar" planets can be directly measured and compared.



Credit: NASA/JPL-Caltech/R. Hurt (SSC)

"Spitzer has provided us with a powerful new tool for learning about the temperatures, atmospheres and orbits of planets hundreds of light-years from Earth," said Dr. Drake Deming of NASA's Goddard Space Flight Center, Greenbelt, Md., lead author of a new study on one of the planets.

"It's fantastic," said Dr. David Charbonneau of the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass., lead author of a separate study on a different planet. "We've been hunting for this light for almost 10 years, ever since extrasolar planets were first discovered." The Deming paper appears today in Nature's online publication; the Charbonneau paper will be published in an upcoming issue of the Astrophysical Journal.

So far, all confirmed extrasolar planets, including the two recently observed by Spitzer, have been discovered indirectly, mainly by the "wobble" technique and more recently, the "transit" technique. In the first method, a planet is detected by the gravitational tug it exerts on its parent star, which makes the star wobble. In the second, a planet's presence is inferred when it passes in front of its star, causing the star to dim, or blink. Both strategies use visible-light telescopes and indirectly reveal the mass and size of planets, respectively.

In the new studies, Spitzer has directly observed the warm infrared glows of two previously detected "hot Jupiter" planets, designated HD 209458b and TrES-1. Hot Jupiters are extrasolar gas giants that zip closely around their parent stars. From their toasty orbits, they soak up ample starlight and shine brightly in infrared wavelengths.

To distinguish this planet glow from that of the fiery hot stars, the astronomers used a simple trick. First, they used Spitzer to collect the total infrared light from both the stars and planets. Then, when the planets dipped behind the stars as part of their regular orbit, the astronomers measured the infrared light coming from just the stars. This pinpointed exactly how much infrared light belonged to the planets. "In visible light, the glare of the star completely overwhelms the glimmer of light reflected by the planet," said Charbonneau. "In infrared, the star-planet contrast is more favorable because the planet emits its own light."

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The Spitzer data told the astronomers that both planets are at least a steaming 1,000 Kelvin (727 degrees Celsius, 1340 Fahrenheit). These measurements confirm that hot Jupiters are indeed hot. Upcoming Spitzer observations using a range of infrared wavelengths are expected to provide more information about the planets' winds and atmospheric compositions.

The findings also reawaken a mystery that some astronomers had laid to rest. Planet HD 209458b is unusually puffy, or large for its mass, which some scientists thought was the result of an unseen planet's gravitational pull. If this theory had been correct, HD 209458b would have a non-circular orbit. Spitzer discovered that the planet does in fact follow a circular path. "We're back to square one," said Dr. Sara Seager, Carnegie Institution of Washington, Washington, co-author of the Deming paper. "For us theorists, that's fun."

Spitzer is ideally suited for studying extrasolar planets known to transit, or cross, stars the size of our Sun out to distances of 500 light-years. Of the seven known transiting planets, only the two mentioned here meet those criteria. As more are discovered, Spitzer will be able to collect their light -- a bonus for the observatory, considering it was not originally designed to see extrasolar planets. NASA's future Terrestrial Planet Finder coronagraph, set to launch in 2016, will be able to directly image extrasolar planets as small as Earth.

Shortly after its discovery in 1999, HD 209458b became the first planet detected via the transit method. That result came from two teams, one led by Charbonneau. TrES-1 was found via the transit method in 2004 as part of the NASA-funded Trans-Atlantic Exoplanet Survey, a ground-based telescope program established in part by Charbonneau.

Artist's concepts and additional information about the Spitzer Space Telescope are available at http://www.spitzer.caltech.edu/Media.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center, at the California Institute of Technology in Pasadena. Caltech manages JPL for NASA. For more information contact Nancy Neal Jones, Goddard Space Flight Center, 301/286-0039; or David Aguilar, Harvard-Smithsonian Center for Astrophysics, 617/495-7462.

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David Haviland
Vice-president and Secretary

This artist's impression shows how the Arches star cluster appears from deep inside the hub of our Milky Way Galaxy. Although hidden from our direct view, the massive cluster lies 25,000 light-years away and is the densest known gathering of young stars in our galaxy. The illustration is based on infrared observations with Hubble and with ground-based telescopes, which pierced our galaxy's dusty core and snapped images of the luminous cluster of about 2,000 stars.

Some of the brightest blue stars in this illustration are among the most massive stars astronomers found with the Hubble telescope, weighing about 130 times more than our Sun. The cluster is so young, about 2 to 2.5 million years old, that Hubble caught them before they exploded as supernovae. The cluster's massive stars are illuminating a wall of a giant hydrogen cloud [the reddish-purple filamentary structure along the right edge]. Large clouds like this one make hefty clusters like the Arches. The bright reddish object at upper right is the center of our galaxy, residing 100 light-years away from the Arches cluster. The glowing purple thread-like objects at lower left and the purple arcs at upper right are high-energy particles caught up in strong magnetic fields. Astronomers do not know the origin of these fields.

Credit: NASA, ESA and A. Schaller (for STScI)

Hubble Weighs in on the Heaviest Stars in the Galaxy

Release Date: 2:00PM (EST) March 9, 2005
Release Number: STScI-2005-05

Unlike humans, stars are born with all the weight they will ever have. A human's birth weight varies by just a few pounds, but a star's weight ranges from less than a tenth to more than 100 times the mass of our Sun. Although astronomers know that stars come in a variety of masses, they are still stumped when it comes to figuring out if stars have a weight limit at birth.

Now astronomers have taken an important step toward establishing a weight limit for stars. Using NASA's Hubble Space Telescope, astronomers made the first direct measurement within our Milky Way Galaxy that stars have a limit to how large they can form. Studying the densest known cluster of stars in our galaxy, the Arches cluster, astronomers determined that stars are not created any larger than about 150 times the mass of our Sun, or 150 solar masses.

The finding takes astronomers closer to understanding the complex star-formation process and gives the strongest footing yet to the idea that stars have a weight limit. Knowing how large a star can form may offer important clues to how the universe makes stars. Massive stars are the "movers and shakers" of the universe. They manufacture many of the heavier elements in the cosmos, which are the building blocks for new stars and planets. Hefty stars also may be the source of titanic gamma-ray bursts, which flood a galaxy with radiation.

"This is an incredible cluster that contains a rich collection of some of the most massive stars in the galaxy, yet it appears to be 'missing' stars more massive than 150 times the mass of our Sun," said astronomer Donald F. Figer of the Space Telescope Science Institute in Baltimore, Md. "Theories predict that the more massive the cluster, the more massive the stars within it. We looked at one of the most massive clusters in our galaxy and found that there is a sharp cutoff to how large a star can form.

"Standard theories predict 20 to 30 stars in the

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Arches cluster with masses between 130 and 1,000 solar masses. But we found none. If they had formed, we would have seen them. If the prediction was only one or two stars and we saw none, then we could claim that our result could be due to statistical errors."

Figer is pursuing follow-up studies to determine an upper limit in other star clusters to test his result. His finding is consistent with statistical studies of smaller-mass star clusters in our galaxy and with observations of a massive star cluster known as R136 in our galactic neighbor, the Large Magellanic Cloud. In that cluster, astronomers discovered that stars were not created any larger than 150 solar masses.

Astronomers have been uncertain about how large a star can get before it cannot hold itself together and blows itself apart. Even with the advances in technology, astronomers do not know enough about the details of the star-formation process to determine an upper-mass limit for stars. Consequently, theories have predicted that stars can be anywhere between 100 to 1,000 times more massive than our Sun. Predicting a lower weight limit for stars has been easier. Objects less than one-tenth a solar mass are not hefty enough to sustain nuclear fusion in their cores and shine as stars.

Making this finding was so tricky that Figer spent seven years puzzling over the Hubble data. The results are published in the March 10th issue of the journal Nature.

"Knowing that extraordinary claims demand extraordinary proof, I scratched my head for a long time trying to figure out why the result might be wrong," he said.

Figer used Hubble's Near Infrared Camera and Multi-Object Spectrometer to study hundreds of stars ranging from 6 to 130 solar masses. (Although Figer did not find any stars larger than 130 solar masses, he conservatively set the upper limit at 150 solar masses.) The Arches cluster is a youngster, about 2 to 2.5 million years old, and resides 25,000 light-years away in our galaxy's hub, a hotbed of massive star formation. In this rough-and-tumble region, huge clouds of gas collide to form behemoth stars.

Hubble's infrared camera is well suited to analyze the Arches because it penetrates the dusty core of our galaxy and produces sharp images, allowing the telescope to see individual stars in a tightly packed cluster. Figer estimated the stars' masses by measuring the ages of the cluster and the brightness of the individual stars. He also collaborated with Francisco Najarro of the Instituto de Estructura de la Materia in Madrid, who produced detailed models to confirm the masses, chemical abundances, and ages of the cluster's stars.

A cluster must meet a long list of requirements for astronomers to use it for identifying an upper-mass limit. The cluster must be hefty enough, about 10,000 solar masses, to produce stars large enough to probe the upper limit. A cluster also cannot be too young or too old. Selecting an older cluster — beyond 2.5 million years — means that many of the massive young stars have already exploded as supernovas. In a very young cluster — less than 2 million years old — many of the stars are still enshrouded in their natal dust clouds, and astronomers cannot see them.

Another important factor is a cluster's distance from Earth. Astronomers must know the cluster's distance to reliably estimate the brightness of its stars, a key ingredient used to estimate a star's mass. The cluster also must be close enough to see individual stars. The Arches cluster is the only cluster in the galaxy that meets all of those requirements, Figer said.

The Arches outshines almost every other star cluster in the galaxy. With a mass equivalent to more than 10,000 stars like our Sun, the monster cluster is 10 times heavier than typical young star

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clusters, such as the Orion cluster, scattered throughout our Milky Way. If our galactic neighborhood were as cluttered with stars, more than 100,000 stars would fill the void of space between our Sun and its nearest neighbor, the star Alpha Centauri, 4.3 light-years away. Astronomers estimate that only 1 out of every 10 million stars in the galaxy is as bright as the stars in the Arches cluster. At least a dozen of the cluster's stars weigh about 100 times the mass of our Sun.

Figer cautions that the upper limit does not rule out the existence of stars larger than 150 solar masses. Such hefty stars, if they exist, could have gained weight by merging with another massive star. For example, the young Pistol star, located near our galactic hub, is 150 to 250 times more massive than our Sun. This behemoth star, however, seems out of place because it dwells in a neighborhood of older stars. One way to explain this apparent paradox, Figer said, is that the Pistol could be a "born-again" star, formed from the merger of two stars. His explanation is not just theory. Astronomers have found older stars that have been reborn through mergers with other stars in ancient globular star clusters.

The Pistol also could be part of a double-star system that is masquerading as a single giant star. The two stars have not been unmasked because they cannot be resolved by even the Hubble telescope.

Double-star systems, astronomers also caution, could make up some of the most massive stars in the Arches cluster. This means that the upper limit in the Arches could be lower than 150 solar masses, but not any higher.

Figer's next step is to pinpoint more clusters to test his weight limit. Several telescopes, including the Spitzer Space Telescope, have been searching for new star clusters in our Milky Way. In the last two years, the number of known clusters in our galaxy has doubled from a few hundred to 500, Figer said. Many of the newly found clusters are compiled in the Two Micron All Sky Survey (2MASS) catalogue. Figer already has identified about 130 of these newly discovered clusters as possible candidates to study. NASA has recognized Figer's important work by giving him a five-year Long Term Space Astrophysics award, which will support his hunt for the most massive stars in the Milky Way.

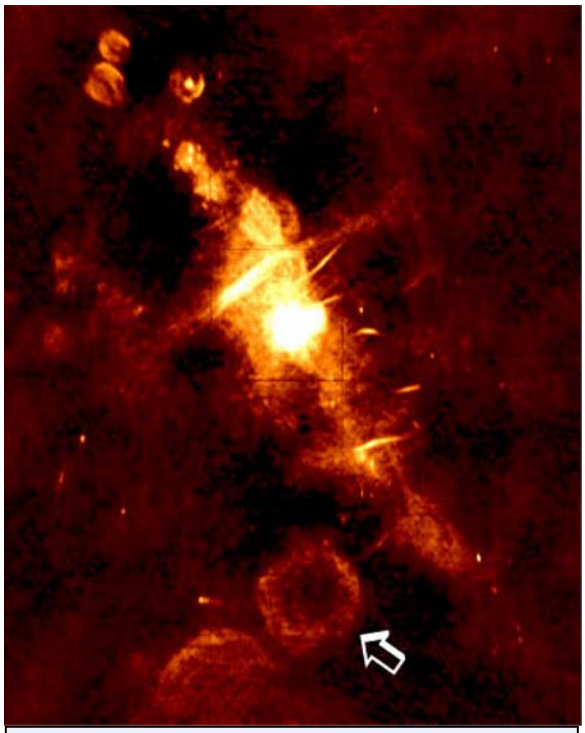
Member Recognition

Becky Ramotowski's image of the crescent Moon and Mercury posted on www.spaceweather.com on March 13th.

A new book is about to hit bookstores. *Introduction to Digital Astrophotography - Imaging the Universe with a Digital Camera* was written by Robert Reeves. Robert has been working on this book for the past year. The book features images from many well known amateur astronomers, including six images by JSCAS' own **Becky Ramotowski**. It should be available by TSP. For more information, visit: http://www.willbell.com/DigitaAstrophoto/Default.htm.

Astronomers Detect Powerful Bursting Radio Source Discovery Points to New Class of Astronomical Objects

NRAO Press Release March 2, 2005



This radio image of the central region of the Milky Way Galaxy holds a new radio source, GCRT J1745-3009. The arrow points to an expanding ring of debris expelled by a supernova.

CREDIT: N.E. Kassim et al., Naval Research Laboratory, NRAO/AUI/NSF

Astronomers at Sweet Briar College and the Naval Research Laboratory (NRL) have detected a powerful new bursting radio source whose unique properties suggest the discovery of a new class of astronomical objects. The researchers have monitored the center of the Milky Way Galaxy for several years and reveal their findings in the March 3, 2005 edition of the journal, “Nature”.

Principal investigator, Dr. Scott Hyman, professor of physics at Sweet Briar College, said the discovery came after analyzing some additional observations from 2002 provided by researchers at Northwestern University. “"We hit the jackpot!” Hyman said referring to the observations. “An image of the Galactic center, made by collecting radio waves of about 1-meter in wavelength, revealed multiple bursts from the source during a seven-hour period from Sept. 30 to Oct. 1, 2002 — five bursts in fact, and repeating at remarkably constant intervals.”

Hyman, four Sweet Briar students, and his NRL collaborators, Drs. Namir Kassim and Joseph Lazio, happened upon transient emission from two radio sources while studying the Galactic center in 1998. This prompted the team to propose an ongoing monitoring program using the National Science Foundation’s Very Large Array (VLA) radio telescope in New Mexico. The National Radio Astronomy Observatory, which operates the VLA, approved the program. The data collected, laid the groundwork for the detection of the new radio source.

“Amazingly, even though the sky is known to be full of transient objects emitting at X- and gamma-ray wavelengths,” NRL astronomer Dr. Joseph Lazio pointed out, “very little has been done to look for radio bursts, which are often easier for astronomical objects to produce.”

The team has monitored the Galactic center for new transient sources and for variability in approximately 250 known sources, but the five bursts from the new radio source, named GCRT J1745-3009, were by far the most powerful seen. The five bursts were of equal brightness, with each lasting about 10 minutes, and occurring every 77 minutes.

The source of the bursts is transient Hyman noted. &Ldquo;It has not been detected since 2002 nor is it present on earlier images.”

Although the exact nature of the object remains a mystery, the team members currently believe that

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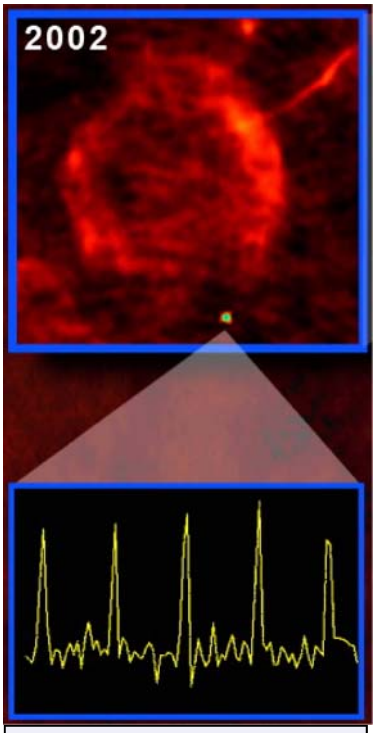
GCRT J1745-3009 is either the first member of a new class of objects or an unknown mode of activity of a known source class.

One important clue to understanding the origin of the radio bursts is that the emission appears to be “coherent,” Hyman said. “There are very few classes of coherent emitters in the universe. Natural astronomical masers — the analog of laser emission at microwave wavelengths — are one class of coherent sources, but these emit in specific wavelengths. In contrast, the new transient’s bursts were detected over a relatively large bandwidth.”

“In addition to these intriguing properties, NRL astronomer Dr. Paul Ray and colleague, Dr. Craig Markwardt of NASA’s Goddard Space Flight Center, have searched the source for X-ray emission but have not found any convincing evidence. “The non-detection of X-ray emission is intriguing,” Ray said. “Many sources that emit transient X-ray flares, such as black hole binary star systems, also have associated radio emission. If upon further observations, X-ray emission is definitively detected or ruled out, this will be a significant help in understanding the nature of this remarkable source.”

“Needless to say, the discovery of these transients has been very exciting for our students,” Hyman added. Participating in this research program has inspired at least two of Hyman’s students — Jennifer Neureuther and Mariana Lazarova — to pursue graduate studies in astronomy.

This project was supported at Sweet Briar College by funding from Research Corporation and the Jeffress Foundation. Basic research in radio astronomy at NRL is supported by the Office of Naval Research.



The new radio source is located below the expanding ring of debris of this supernova remnant. The plot illustrates the radio light curve of the five detected bursts occurring every 77 minutes.

Endurance Crater’s Dazzling Dunes

08/06/2004 Opportunity Image Credit: NASA/JPL/Cornell

As NASA's Mars Exploration Rover Opportunity crept farther into "Endurance Crater," the dune field on the crater floor appeared even more dramatic. This false-color image taken by the rover's panoramic camera shows that the dune crests accumulated more dust than the flanks of the dunes and the flat surfaces between them. Also evident is a "blue" tint on the flat surfaces as compared to the dune flanks. This results from the presence of the hematite-containing spherules ("blueberries") that accumulate on the flat surfaces.

Sinuous tendrils of sand less than 1 meter (3.3 feet) high extend from the main dune field toward the rover. Dunes are a common feature across the surface of Mars, and knowledge gleaned from investigating the Endurance dunes close-up may have applied to similar dunes elsewhere. Rover drivers discovered that the slippery slope that led to the dunes was not firm enough to ensure a successful drive back out of the crater, and the dune field may have been a true sand trap, so Opportunity ultimately did not cruise around too close to the dunes.

Lighting Legislation

Ken Lester

There are nine lighting bills currently being considered by the 79th Texas Legislature, as reported on the following web page: http://www.capitol.state.tx.us/tlo/reports/subject/79R/scode.htm under the heading "LIGHTING ". They are summarized below.

HB 775 Author: Gonzales / et al.
Sponsor: none
Last Action: 03/09/2005 H Committee report sent to Calendars
Relating to the allocation of certain community development block grant program money for the installation of street lights in colonias.

HB 1069 Author: Solis
Sponsor: none
Last Action: 02/16/2005 H Referred to Civil Practices
Relating to liability of a governmental unit for a claim arising from roadway lighting conditions.

HB 2253 Author: Rose
Sponsor: none
Last Action: 03/14/2005 H Referred to County Affairs
Relating to the authority of counties to regulate the use of outdoor lighting; providing a penalty.

HB 3448 Author: Solis
Sponsor: none
Last Action: 03/11/2005 H Filed
Relating to the collection of street lighting service fees by a county or by certain public or private entities contracting with a county.

SB 645 Author: Barrientos
Sponsor: none
Last Action: 03/02/2005 S Referred to Intergovernmental Relations
Relating to the authority of certain counties to regulate the use of outdoor lighting.

SB 647 Author: Lucio
Sponsor: none
Last Action: 03/02/2005 S Referred to International Relations and Trade
Relating to the allocation of certain community development block grant program money for the installation of street lights in colonias.

SB 768 Author: Wentworth
Sponsor: none
Last Action: 03/10/2005 S Referred to Intergovernmental Relations
Relating to the authority of counties to regulate the use of outdoor lighting; providing a penalty.

(Continued on page 26)

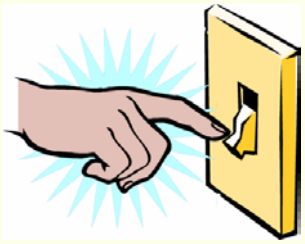
(Continued from page 25)

SB 994 Author: Lucio
Sponsor: none
Last Action: 03/14/2005 S Referred to State Affairs
Relating to liability of a governmental unit for a claim arising from roadway lighting conditions.

SB 1678 Author: Barrientos
Sponsor: none
Last Action: 03/11/2005 S Filed
Relating to the powers of the Lower Colorado River Authority to adopt and implement certain environmental conservation measures.

Help turn off the lights...

Join the
International Dark-Sky Association (IDA)
http://www.darksky.org
"To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting."



Upcoming Events

Ring of Fire—Panama Eclipse Tour: April 6th through 10th.

Haak Winery Star Party: The Haak Winery/JSCAS Wine and Stars Party will be held April 9th at the Haak Winery in Santa Fe, Texas. The star party starts at dark and ends about 9:30 pm.

Texas Star Party: May 1st thru 8th near Fort Davis, Texas.

ArkLaTex Star Party: The Red River Astronomy Club (RRAC) will host the first ArkLaTex Star Party from September 1st through Labor Day, September 5th near Nashville, Arkansas. In a message from Roy Clingan of RRAC, Roy stated: "Armed with new technology, amateurs are contributing vast amounts of data and research to the scientific community. Hear what you can do in the fields of spectroscopy, cataclysmic variables, NEO and super nova searches. There are also presentations on collimation, imaging and a history of amateur contributions."

The ArkLaTex Star Party will supply dark skies, plenty of camping space, a vendor (Rex's Astro Stuff), presentations by professional and amateur astronomers, meals, T-shirts, swap meet, showers, electricity, door prizes, movies on a 72 inch screen and broad band internet access on the field via wireless connection. There are also many interesting, beautiful and historic sites surround Nashville, including a diamond mine, an Indian village and canoeing.

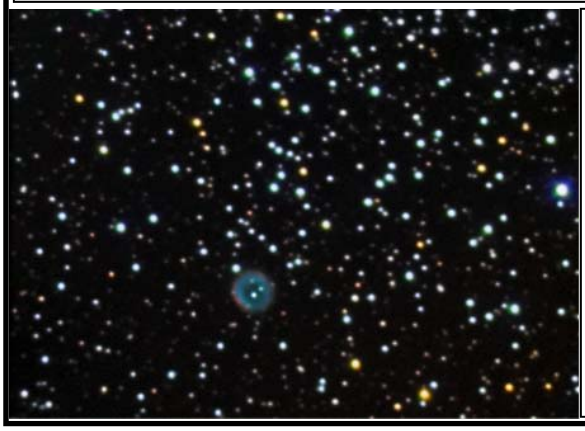
For more information, please visit: http://www.rrac.org.

MEMBER'S GALLERY

M 57 and NGC 7635
©Randy Brewer

This is a wide field shot of the Bubble nebula in Cassiopeia that has a nice little open cluster near it (M-52). The image was taken on October 14, 2004 from Stars End, New Mexico using a 6" F/5 Takahashi FCT-150 refractor and an SBIG ST-10XME camera with Don Goldman's LRGB filters. Exposures were 120:15:15:15 minutes (LRGB).

According to Randy, "I have another shot of the Bubble that I took a few years ago. I wanted to re-shoot it with the open cluster and process it with what I have learned since the last shot."



NGC 2438
©Al Kelly

Planetary nebula NGC 2438 and open cluster M46 in Puppis, made from images taken with a Starlight Express MX916 camera and a 17.5" Newtonian on 3/11/05 from Friendswood, using Schuler RGcBc filters. Exposures: 6 — 240 second unfiltered; 3 — 240 second red; 2 — 240 second green; and 3 — 240 second blue were self-guided in Astroart and processed in AIP4WIN and Photoshop.

Visual Observing

Chris Randall

★**SSO**: (Solar System Objects) Summary for the 15 April 05

Object	Const	Mag	% Ill	Rise Time	Transient	Set Time
Sun	Psc	-26.7	100	06:54	13:20	19:46
Moon	Gem	--	45	11:47	19:11	01:44
Mercury	Psc	1.1	26	05:54	11:55	17:56
Venus	Ari	-3.9	100	07:12	13:38	20:09
Mars	Cap	0.8	88	03:49	09:13	14:36
Jupiter	Vir	-2.4	100	18:37	00:34	06:28
Saturn	Gem	0.6	100	12:19	19:18	02:13
Uranus	Aqr	5.9	100	04:48	13:30	16:11
Neptune	Cap	7.9	100	03:39	09:04	14:29
Pluto	Ser	13.9	99	23:56	05:23	10:49
C/2004 Q2 Machholz	Dra	8.3	90	----	23:38	-----

Highlighted times denote daylight events.

★ **BSO**: (Bright Sky Objects)

Mel 111 – Open Cluster in Coma Berenices, Magnitude 1.8, Size 275'.
NGC 3228 – Open Cluster in Vela, Magnitude 6.0, Size 18.0', ~ 15 Stars.
NGC 3201 (C-79) – Globular Cluster in Vela, Magnitude 6.9, Size 20.0'.
NGC 3031 (M-81) – Galaxy in Ursa Major, Magnitude 7.9 (B), Size 27.1' x 14.2'.

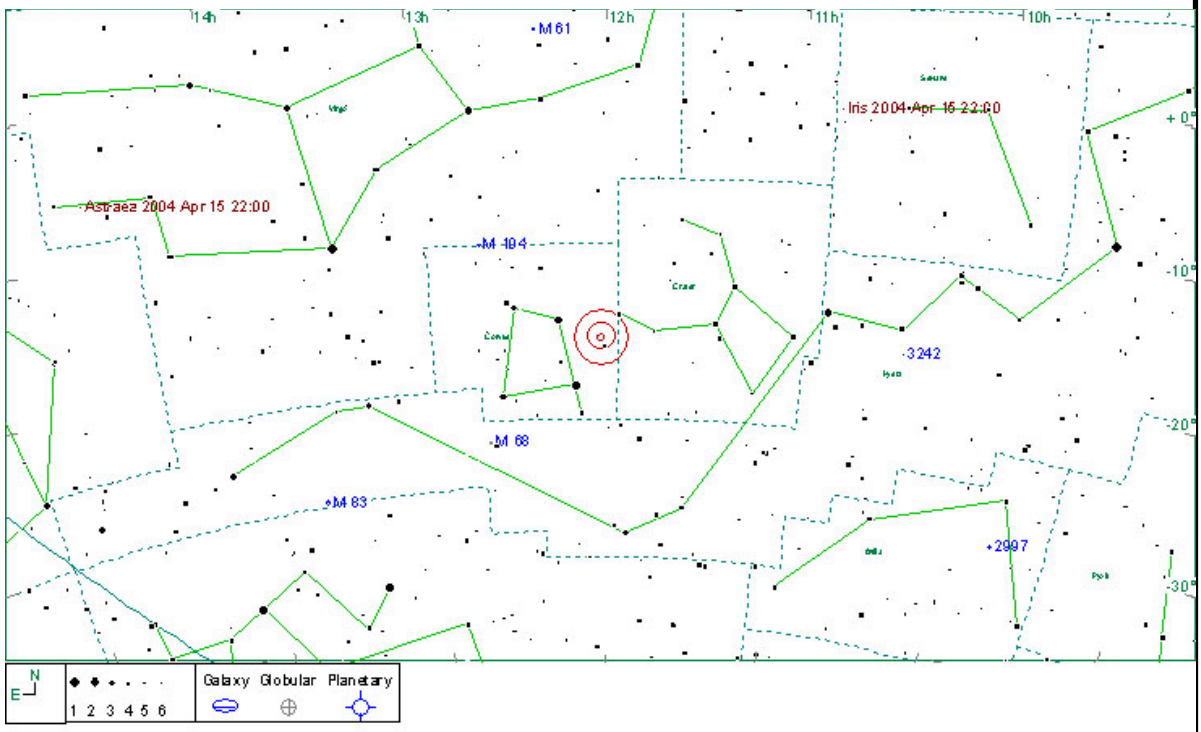
★**DSO**: (Dark Sky Objects)

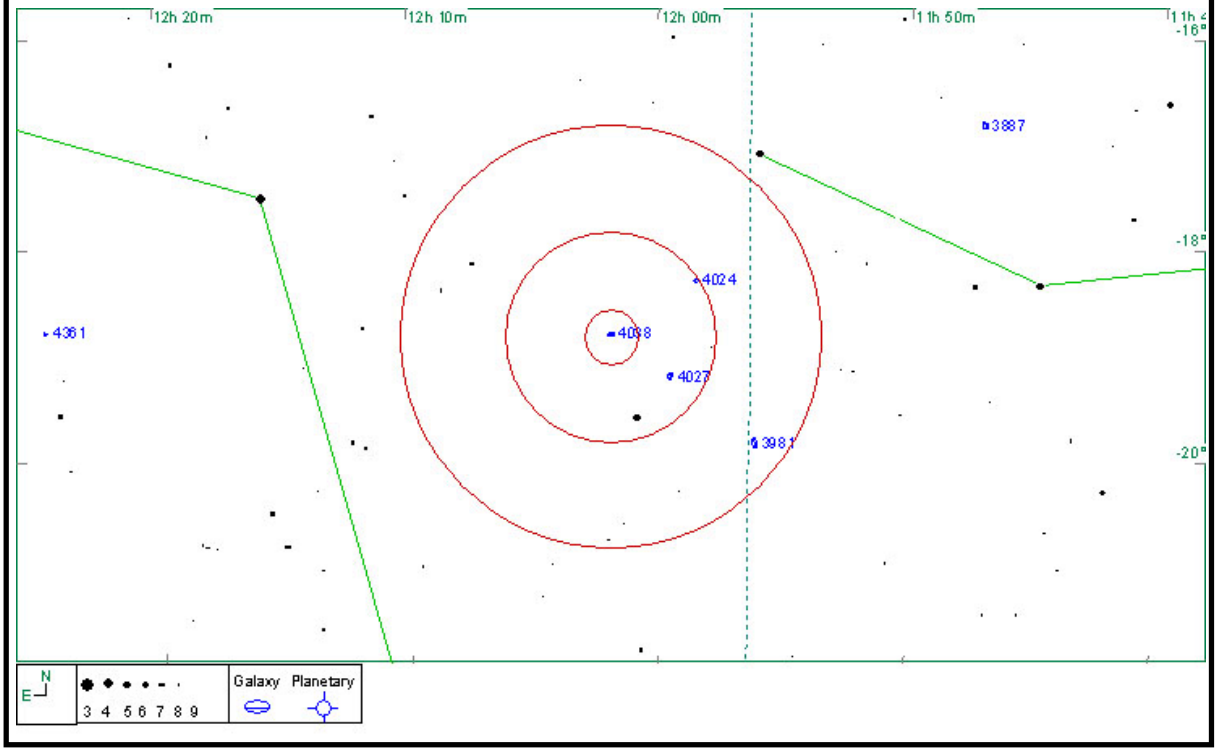
NGC 3132 (C-74) – Planetary Nebula in Vela, Magnitude 8.2 (P), Size 1.5' x 0.9'.
NGC 3115 (C-53) – Galaxy in Sextans, Magnitude 9.9 (B), Size 7.2' x 2.4'.
NGC 4321 (M100) – Galaxy in Coma Berenices, Magnitude 10.1 (B), Size 7.5' x 6.3'.
Trio in Leo (Three amazing Galaxies in one FOV):
NGC 3627 (M-66) – Galaxy in Leo, Magnitude 9.7 (B), Size 9.1' x 4.1'.
NGC 3623 (M-65) – Galaxy in Leo, Magnitude 10.3 (B), Size 9.8' x 2.8'.
NGC 3628 – Galaxy in Leo, Magnitude 10.3 (B), Size 14.8' x 2.9'.

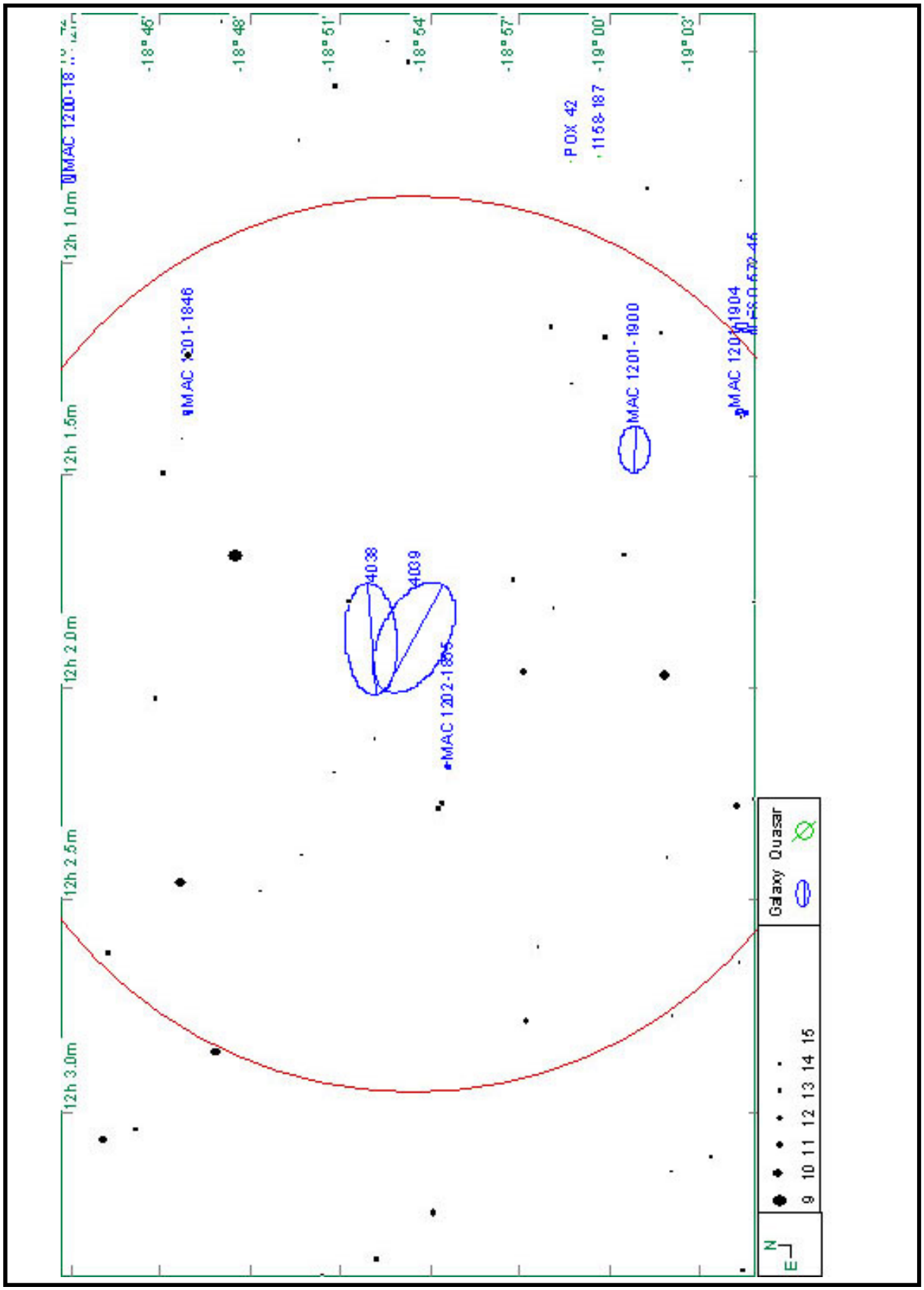
★CDMP: **(Chris' Don't** Miss Pick)

The Antennae– Interacting Galaxies (Arp 244) in Corvus. Look for the tails!
NGC 4038– Magnitude 10.9 (P), Size 3.7' x 1.7'.
NGC 4039 – Magnitude 11.1 (P), Size 4.0' x 2.2'.

Finder Charts for the Antennae Galaxies






-18° 45'
-18° 48'
-18° 51'
-18° 54'
-18° 57'
-19° 00'
-19° 03'
12h 1.0m
12h 1.5m
12h 2.0m
12h 2.5m
12h 3.0m
MAC 1200-18
MAC 1201-1846
MAC 1201-1900
MAC 1202-1904
MAC 1202-1855
4038
4039
POX 42
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N
E
9 10 11 12 13 14 15
Galaxy Quasar

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SIGS

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April Meeting Agenda

April 8th, 7:30 p.m., Center for Advanced Space Studies/ Lunar Planetary Institute, 3600 Bay Area Blvd. (at Middlebrook Drive).

- Welcome!!!
- Guest Speaker: Dr. Mark Clampin, Hubble Space Telescope Institute — *The Hubble and James Webb Space Telescopes*
- Break
- SIG reports, Star Party News
- Astronomical Oddities — Hernan Contreras
- Last Words, Door Prizes

Any unfinished discussions can be continued over food and beverages at a location to be announced at the end of the meeting.

Starscan Submission Procedures

Original articles of astronomical interest will be accepted up to 6 P.M. April 25th.

The most convenient way to submit articles or a Calendar of Events is by electronic mail, however computer diskettes or CDs will also be accepted. All articles should include author's name and phone number. Also include any picture credits. The recommended format is Microsoft Word. Text files will also be accepted.

Submitter bears all responsibility for the publishing of any e-mail addresses in the article on the World Wide Web.

Editor's electronic address is: lesteke@swbell.net. Be sure to include the word Starscan in the subject line for proper routing of your message.

Starscan Staff

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	Ken Steele

Cover Image
NASA/JPL-Caltech/J. Hora (Harvard-Smithsonian Center for Astrophysics)

NASA's Spitzer Space Telescope finds a delicate flower in the Ring Nebula. The outer shell of this planetary nebula looks surprisingly similar to the delicate petals of a camellia blossom. A planetary nebula is a shell of material ejected from a dying star. Located about 2,000 light years from Earth in the constellation Lyra, the Ring Nebula is also known as Messier Object 57 and NGC 6720. It is one of the best examples of a planetary nebula and a favorite target of amateur astronomers. The spiral galaxy, IC 1296, lies in the upper left of the image.