

Catskills Astronomy Club News

12/1/04

Club News:

The club observation session of November 6th was held at Walnut Mountain. Six club members and two guests attended throughout the evening. Brian Deis brought his 20 inch dobsonian telescope and treated us to some great views of many deep sky objects such as the galaxies M33 and NGC 7331. Toward the end of the evening we were able to observe the Orion nebula M42 as well as Saturn. We also saw many brilliant meteors during the session. Some of these may have been from the Taurid meteor shower that lasts through November. The picture below shows Brian's big scope.



On November 13th the Catskills Astronomy Club and the Orange County Astronomical Association held a joint observing session at the Deis Observatory in Chester, NY. Many members of both clubs attended. The observatory houses a 16 inch Meade schmidt cassegrain telescope. Many deep sky objects were viewed through it. Outside the observatory a 20' x 30' brick observing pad was available for other telescopes to setup. That evening some of the other scopes that were present were a 20 inch dobsonian reflector, 12 inch dobsonian reflector, and a ten inch Newtonian reflector.

The next December club observation session after the 4th is on the 11th at Walnut Mountain.

Anyone interested in submitting an astronomical observation or photograph for the newsletter, please contact John at kocis@verizon.net.

Each month the photo section of our newsletter will highlight the telescopes and equipment of club members. If you have a photo of your scope or equipment and a brief description of it that you would like to contribute please send it to John at kocis@verizon.net.

The club has selection of astronomy books, a Macintosh computer with astronomy software, and a Meade eight inch reflector for members to borrow. Please contact John at 791-5240 or kocis@verizon.net if you are interested in borrowing any of these.

Astronomy News:

Here are some articles from various NASA sources that might be of interest.

Image Advisory: 2004-278

November 23, 2004

Cassini Shows Grandeur of Two Saturn Moons

New views of two of Saturn's moons, Titan and Tethys, represent the most detailed look at these moons to date and show a sharp contrast between them -- one is foggy and one is cratered.

The Cassini spacecraft captured the puzzle pieces for the full-disc view of the mysterious Titan during its first close encounter on Oct. 26, 2004. The mosaic comprises nine images taken at distances ranging from 650,000 kilometers (400,000 miles) to 300,000 kilometers (200,000 miles).

The pictures are available at <http://saturn.jpl.nasa.gov> , <http://www.nasa.gov/cassini> and <http://ciclops.org> .

The images that make up the mosaic were processed to reduce effects of the atmosphere and to sharpen surface features. The mosaic of images has been trimmed to show only the illuminated surface and not the atmosphere around the edge of the moon. The Sun was behind Cassini, so nearly the full disc was illuminated. South polar clouds are seen at the bottom.

Surface features are best seen near the center of the moon. The surface features become fuzzier toward the outside of the image, where the spacecraft is peering through more haze. The brighter region on the right side near the equator is named Xanadu Regio. Scientists are debating what processes may have created the bizarre surface brightness patterns seen there. Titan's lack of obvious craters is a hint of a young surface. However, the exact nature of that activity, whether tectonic, wind-blown, river-related, marine or volcanic, is still unknown.

Two days after the close encounter with icy Titan, Cassini captured the images used in the mosaic of the battered and cratered moon Tethys. The result is the best-ever natural color view of Titan.

As seen here, the surface of Tethys has a neutral hue. Three images form this natural color composite. The mosaic reveals a world nearly saturated with craters -- many small craters lie on

top of older, larger ones, suggesting an ancient surface. Grooves can be seen at the top and along the boundary between day and night.

Tethys is known to have a density very close to that of water, indicating that it is likely composed mainly of water ice. Its frozen mysteries await Cassini's planned close flyby in September 2005.

The images to create this mosaic were taken on Oct. 28, 2004, at a distance of about 256,000 kilometers (159,000 miles) from Tethys. This view shows the trailing hemisphere of Tethys, which is the side opposite the moon's direction of motion in its orbit.

Both images were taken with the narrow angle camera onboard the Cassini spacecraft. The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging team is based at the Space Science Institute, Boulder, Colo.

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Image Advisory: 2004-274

November 9, 2004

Cassini Radar Sees Bright Flow-Like Feature on Titan

A strikingly bright feature that is consistent with an active geology has been seen in one of Cassini's first radar images of Saturn's moon Titan. There are many possibilities for what it is but one of the leading candidates is that it may be a 'cryovolcanic' flow or 'ice volcano'.

"It may be something that flowed," said Cassini radar team member Dr. Ralph Lorenz of the University of Arizona, Tucson. "Or it could be something carved by erosion. It's too early to say.

"But it looks very much like it's something that oozed across the surface. It may be some sort of cryovolcanic flow, an analog to volcanism on Earth that is not molten rock but, at Titan's very cold temperatures, molten ice."

A radar image is available at:

<http://saturn.jpl.nasa.gov/cgi-bin/gs2.cgi?path=../multimedia/images/titan/images/PIA06993.jpg&type=image> and

http://www.nasa.gov/mission_pages/cassini/multimedia/pia06993.html .

Cassini's radar mapped about one percent of Titan's surface during the spacecraft's first close Titan flyby on Oct. 26. The radar survey covered a strip 120 kilometers (75 miles) wide and 1,960 kilometers (1,200 miles) long in Titan's northern hemisphere.

Cassini was flying about 2,494 (1,550 miles) above Titan's surface, with its radar centered at about 45 degrees north, 30 degrees west, when it mapped the 230-square-kilometer (90-square-mile) area shown in the new radar image. The Cassini radar team presented the image yesterday at the 36th annual meeting of the American Astronomical Society's Division for Planetary Sciences in Louisville, Ky.

The radar instrument on board Cassini works by bouncing radio signals off Titan's surface and timing their return. The more signal reflected back to the spacecraft, the brighter the imaged area. Turning radio signals into radar images is time consuming because so many numerical calculations must be made. "There's no such thing as a 'raw' radar image," said Lorenz.

Just two days after the Oct. 26 flyby, Cassini scientists knew that Titan is not a crater-pocked dead world, but a much more interesting place. Titan's surface is young. It might have been altered by ongoing dynamic geologic processes that cover and obscure old impact craters. Lorenz, and Cassini interdisciplinary scientist Dr. Jonathan Lunine also of the University of Arizona, and other Cassini scientists, agree in this interpretation.

Given this newest image, Lunine said, "Cassini's radar has provided the first evidence for possible young cryovolcanism on Titan's surface. Now our challenge is to find out what is flowing, how it works, and the implications for Titan's evolution."

More information on the Cassini-Huygens mission is available at <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassini>.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The radar instrument team is based at JPL working with team members from the United States and several European countries.

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News Release: 2004-275

November 9, 2004

Spitzer Sees Ice and Warm Glows in Dark and Dusty Places

Two new results from NASA's Spitzer Space Telescope released today are helping astronomers better understand how stars form out of thick clouds of gas and dust, and how the molecules in those clouds ultimately become planets.

Two discoveries -- the detection of an oddly dim object inside what was thought to be an empty cloud, and the discovery of icy planetary building blocks in a system believed to resemble our own solar system in its infancy -- were presented today at the first Spitzer science conference in Pasadena, Calif. Since Spitzer science observations began less than one year ago, the infrared capabilities of the space observatory have unveiled hundreds of space objects too dim, cool or distant to be seen with other telescopes.

In one discovery, astronomers have detected a faint, star-like object in the least expected of places -- a "starless core." Named for their apparent lack of stars, starless cores are dense knots of gas and dust that should eventually form individual newborn stars. Using Spitzer's infrared eyes, a team of astronomers led by Dr. Neal Evans of the University of Texas at Austin probed dozens of these dusty cores to gain insight into conditions that are needed for stars to form.

Starless cores are fascinating to study because they tell us what conditions exist in the instants before a star forms. Understanding this environment is key to improving our theories of star formation, said Evans.

But when they looked into one core, called L1014, they found a surprise -- a warm glow coming from a star-like object. The object defies all models of star formation; it is fainter than would be expected for a young star. Astronomers theorize that the mystery object is one of three possibilities: the youngest "failed star," or brown dwarf ever detected; a newborn star caught in a very early stage of development; or something else entirely.

This object might represent a different way of forming stars or brown dwarfs. Objects like this are so dim that previous studies would have missed them. It might be like a stealth version of star formation, Evans said. The new object is located 600 light-years away in the constellation Cygnus.

In another discovery, Spitzer's infrared eyes have peered into the place where planets are born -- the center of a dusty disc surrounding an infant star -- and spied the icy ingredients of planets and comets. This is the first definitive detection of ices in planet-forming discs.

This disc resembles closely how we imagine our own solar system looked when it was only a few hundred thousand years old. It has the right size, and the central star is small and probably stable enough to support a water-rich planetary system for billions of years into the future, said Dr. Klaus Pontoppidan of Leiden Observatory in the Netherlands, who led the team that made this discovery.

Previously, astronomers had seen ices, or ice-coated dust particles, in the large cocoons of gas and dust that envelop young stars. But they were not able to distinguish these ices from those in the inner planet-forming portion of a star's disc. Using Spitzer's ultra-sensitive infrared vision and a clever trick, Pontoppidan and his colleagues were able to overcome this challenge.

Their trick was to view a young star and its dusty disc at "dawn." Discs can be viewed from a variety of angles, ranging from the side or edge-on, where the discs appear as dark bars, to face-on, where the discs become washed out by the light of the central star. They found that if they observed a disc at a 20-degree angle, at a position where the star peeks out like our Sun at dawn, they could see the ices.

"We hit the sweet spot," said Pontoppidan. "Our models predicted that the search for ices in discs is a problem of finding an object with just the right viewing angle, and Spitzer confirmed that model.

In this system, astronomers found ammonium ions as well as components of water and carbon dioxide ice.

The Spitzer science conference, "The Spitzer Space Telescope: New Views of the Cosmos," is being held at the Sheraton Pasadena hotel.

JPL manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington, D.C. Science operations are conducted at the Spitzer Science Center, Pasadena, Calif. JPL is a division of Caltech. For more information about Spitzer visit www.spitzer.caltech.edu .

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News Release: 2004-269

November 4, 2004

Spirit Adds Clues About History of Rocks in Martian Hills

All the scientific tools on NASA's two Mars Exploration Rovers are still working well, a full 10 months after Spirit's dramatic landing.

The ones on Spirit are adding fresh evidence about the history of layered bedrock in a hill the rover is climbing.

"Our leading hypothesis is that these rocks originated as volcanic ash that fell from the air or moved in ground-hugging ash flows, and that minerals in them were altered by water," said Dr. Ray Arvidson of Washington University, St. Louis, deputy principal investigator for the mission.

"This is still a working hypothesis, not a firm conclusion, but all the instruments have contributed clues that fit," he said. "However, it is important to point out that we have just begun to characterize the textures, mineralogy and chemistry of these layered rocks. Other hypotheses for their origin focus on the role of transport and deposition by water. In fact, it may turn out that volcanism, water and wind have produced the rocks that Spirit is examining. We are just beginning to put together the big picture."

Both rovers completed three-month primary missions in April. NASA has extended their missions twice because they have remained productive longer than anticipated.

"We're still making good progress even though Spirit has two types of problems with its wheels," said Jim Erickson, rover project manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "We are working around those problems successfully, but they might be a sign of things to come, as mechanical parts wear out during our exploration of Mars."

One question for continuing investigations as Spirit heads for rocks higher in the "Columbia Hills," is what the environment was like when water altered the minerals. Possibilities include water in the volcanic magma mixture before the ash erupted, surface water transporting the ash while it was still loose after the eruption, and ground water soaking through the rocks that solidified from the accumulated ash.

Some clues for a volcanic-ash origin come from a layered rock dubbed "Uchben." Researchers pointed Spirit's microscopic imager at a spot on Uchben scoured with the rock abrasion tool. The images reveal sand-size particles, many of them sharply angular in shape and some quite rounded. The angularity is consistent with transport by an eruption. Particles carried across the

surface by wind or water usually tumble together and become more rounded. Uchben's rounded particles may be volcanic clumps, may be concretions similar to what Opportunity has found, or may be particles tumbled in a water environment.

Evidence for alteration by water comes mainly from identification of minerals and elements in the rocks by the rover's Moessbauer spectrometer and alpha particle X-ray spectrometer.

The rovers' principal investigator, Dr. Steve Squyres of Cornell University, Ithaca, N.Y., said, "We have really made headway just in the last several weeks in understanding these rocks. The most likely origin is debris that blasted out of a volcano, was transported by air or water to its present location, and settled out in layers."

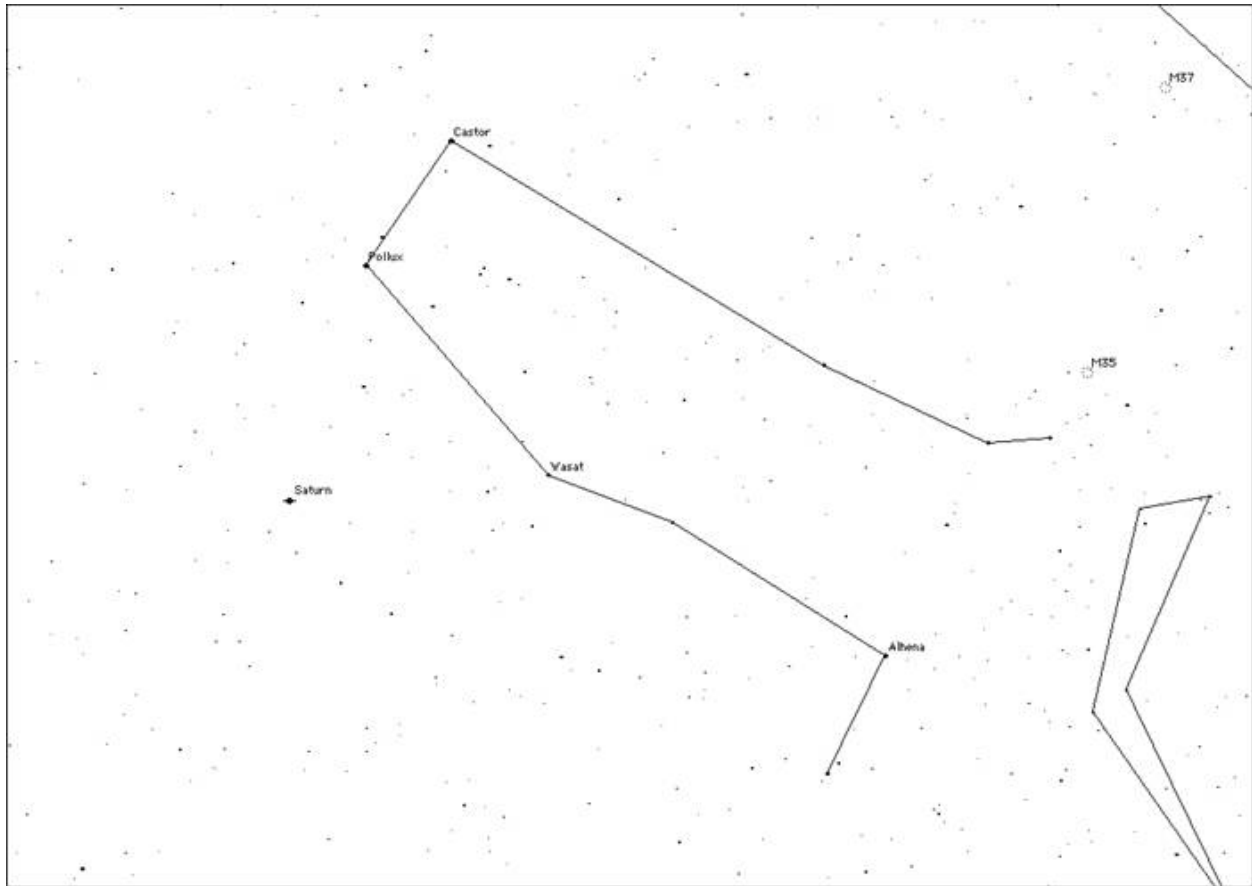
Opportunity, meanwhile, examined a lumpy boulder called "Wopmay" inside "Endurance Crater." The slope of the ground and loose surface material around the rock prevented Opportunity from getting firm enough footing to use its rock abrasion tool. Evidence from the spectrometers and microscopic imager is consistent with scientists' earlier hypothesis that rocks near the bottom of the crater were affected by water both before and after the crater formed. The evidence is still not conclusive, Squyres said.

Opportunity is heading toward the base of "Burns Cliff," a tall exposure of layered rock in the wall of the crater. However, if the rover encounters more of the poor traction found around Wopmay, planners may change course and drive up out of the crater.

JPL, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover project for NASA's Science Mission Directorate, Washington. Images and additional information about the project are available from JPL at <http://marsrovers.jpl.nasa.gov> and from Cornell University at <http://athena.cornell.edu> .

Mid Evening Observing Highlights for December

Saturn can be found in the eastern sky in Gemini. Orion and Gemini are rising in the east. Auriga and Taurus are higher in the eastern sky. Auriga contains the open clusters M36, M37, and M38. The open cluster M34 can be found in the northeastern sky between Andromeda and Perseus. The Double Cluster is high in the northern sky between Cassiopeia and Perseus. The open cluster M35 can be found in Gemini. The bright star Aldebaran can be found in Taurus. The Andromeda Galaxy is almost directly overhead. The Great Square is moving into the western sky. The Milky Way stretches from the east to west. Cygnus is setting in the western sky. Full moon is on December 26th and new moon is on December 12th. The Geminid meteor shower will peak on the evening of the 13th. An almost new moon will make viewing the meteors favorable. Look toward the eastern sky around the constellation Gemini to see them. The picture below shows the location of the open cluster M35 in Gemini, M37 in Auriga, and Saturn.



On the night of December 7th the moon will occult Jupiter. The disappearance will occur a little after 3:55AM EST with the moon being low in the sky. The reappearance will occur around 5:05AM EST when the moon will be higher in the sky. Viewing the reappearance will be more favorable because of this. You may want to get ready to view before the times stated to make sure you catch the events. Check out

http://skyandtelescope.com/observing/objects/occultations/article_1380_1.asp for more information. Check out the chart below for times of reappearance in New York State.

SHOWING CITIES IN NY ON DEC. 7, 2004

City:	Jupiter disappears:	Jupiter reappears:
Albany	3:57:13 AM EST	5:05:06 AM EST
Binghamton	3:55:28 AM EST	5:03:36 AM EST
Buffalo	3:53:57 AM EST	5:00:55 AM EST
CentralIslip	3:56:58 AM EST	5:06:36 AM EST
New York	3:56:23 AM EST	5:05:51 AM EST
NiagaraFalls	3:53:56 AM EST	5:00:43 AM EST
Rochester	3:54:46 AM EST	5:01:51 AM EST

Schenectady	3:57:11 AM EST	5:04:52 AM EST
Syracuse	3:55:42 AM EST	5:03:00 AM EST
Troy	3:57:20 AM EST	5:05:07 AM EST
Utica	3:56:21 AM EST	5:03:41 AM EST
White Plains	3:56:37 AM EST	5:05:57 AM EST
Yonkers	3:56:30 AM EST	5:05:52 AM EST

Observations and Photographs

If you are interested in submitting an observation or photograph please contact John at kocis@verizon.net

The image below is of the conjunction of the last crescent moon, the star Porrima in Virgo, Jupiter, and Venus that occurred on the morning of 11/9/04. It was taken by John Kocijanski with an Olympus D-550 digital camera attached to a tripod.



BARLOW BOB'S CORNER

Barlow Bob is a member of the Rockland Astronomy Club.

What do you observe on a snowy holiday season?

Observe colored Christmas lights through any nebula filter.

You will notice that certain color lights disappear, when viewed through a nebula filter. These types of filters only allow certain waves of light to pass through, blocking other waves.

You can also observe the orange Hanukka Menorah lights

Hold a holographic diffraction grating in back of the nebula filter and you will see the spectrum of the incandescent colored lights, a sodium / mercury street light or fluorescent light. You will notice that certain spectrum emission lines disappear.

If you impress Santa, he may leave the TV 102.

NASA Space Place

Galactic Surprise

by Patrick L. Barry and Dr. Tony Phillips

Open an old astronomy textbook. The basic sketch you'll find there of galaxy formation is fairly simple: a vast cloud of diffuse hydrogen and helium gas condenses under gravity, and dense spots in the cloud collapse to form stars. Voila! A galaxy.

But real galaxies are much more complex than that. A galaxy is a swirling "soup" of billions of stars and roaming black holes, scattered clouds of gas and dust, random flashes of star birth and exploding supernovas, and an unseen and mysterious substance called "dark matter." Over time, all these ingredients mix and interact—pulling and compressing and colliding—and somehow that interplay leads to the galaxies we see today. No wonder it's such a hard problem to solve!

Just over one year into its three-year mission, GALEX is already shedding some new light on the problem.

"Some of the discoveries GALEX has made will change our understanding of how galaxies develop and when, where, and why stars form in galaxies," says Peter Friedman, a researcher at Caltech and Project Scientist for GALEX.

This small space telescope, called the Galaxy Evolution Explorer (GALEX for short), makes its discoveries by taking pictures of millions of galaxies scattered over the whole sky. Some of these galaxies are close by (at least by astronomical standards of "close"), while others are as much as 10 billion light-years away. Because light takes time to travel through space, we see these distant galaxies as they appeared billions of years ago. Comparing young galaxies from the distant past with older, modern galaxies will teach scientists about how galaxies change over time.

Looking at these pictures, scientists were surprised to find many newborn stars in the outer parts of old, mature galaxies. Scientists had assumed that as a galaxy ages, the clouds of gas needed to form new stars in these outer reaches either got used up or blown away. Finding so many new stars in these regions of old galaxies (such as Centaurus A, Messier 101, and Messier 81) shows that, apparently, they were wrong.

Friedman says that astronomers don't know yet how to explain these new findings. Rethinking and improving theories to explain unexpected discoveries has always been the way science makes progress—and GALEX is certainly making progress.

One thing is certain: It's time to re-write some old textbooks.

For more information, see <http://www.galex.caltech.edu/> . Kids can do a galaxy art project and learn more about galaxies and GALEX at <http://spaceplace.nasa.gov/en/kids/galex/art.shtml> .



Caption:

M81 is 10 million light years away. The image on the left was made from GALEX data and shows UV light from hot, new stars. These star forming regions are not detectable in the visible light image on the right (McGraw-Hill Observatory, Kitt Peak, Arizona, Greg Bothum, Univ. of Oregon.)