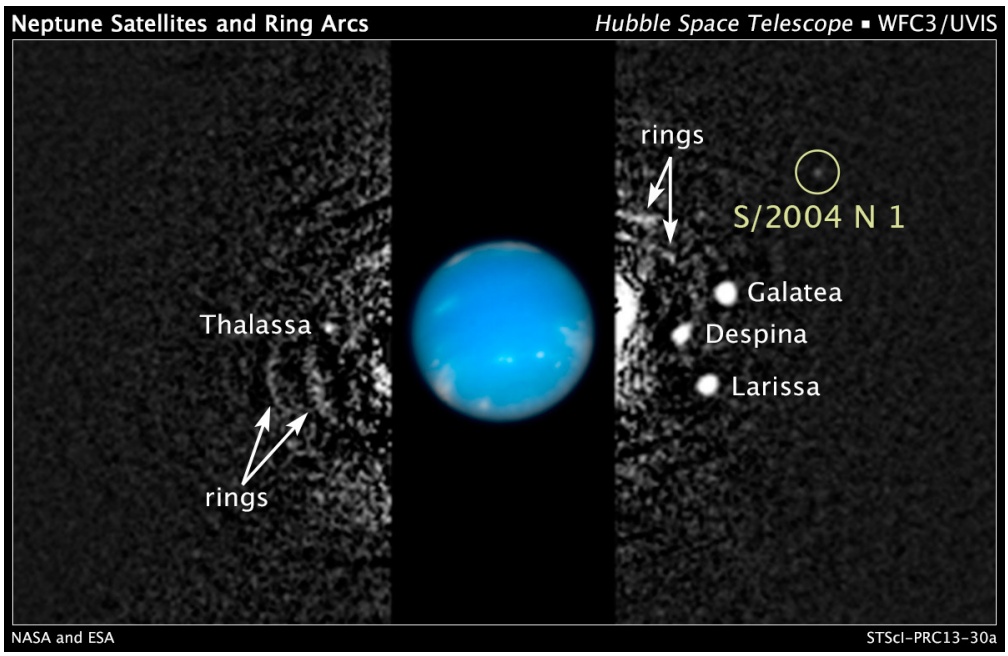
Volume 27 Issue 8

August 2013

The Observer

East Valley Astronomy Club



This composite Hubble Space Telescope picture shows the location of a newly discovered moon, designated S/2004 N 1, orbiting Neptune. The black and white image was taken in 2009 with Hubble's Wide Field Camera 3 in visible light. Hubble took the color inset of Neptune on August 2009. Image Credit: NASA, ESA, M. Showalter/SETI Institute

The Backyard Astronomer
Embrace Your North Poles
by Bill Dellinges

North poles? Plural? Yes. Earth has one. But, there are two others.

The North Pole (not to be confused with magnetic north) and South Pole are simply the two points on a sphere where its axis of rotation intersect the surface of that sphere.

Stargazers utilize this axis for polar aligning their equatorial mounts by extending the rotational axis of Earth as an imaginary line going off into space. Where that line "strikes" the celestial sphere denotes our North Celestial Pole (NCP). Point a scope's polar axis exactly there and a driven mount will track the stars.

Fortuitously, a 2nd magnitude star, Polaris, is currently only 44' (arc minutes) from NCP. A rough alignment of a telescope's polar axis on Polaris will suffice for tracking objects visually.

Precession, a wobbling of the Earth's North Pole due to the moon's gravity tugging on Earth's equatorial bulge, is directing Earth's NCP closer to Polaris and will be nearest to that star in 2105 at a distance of about 28'. (The South Celestial Pole is in Octans, 1 degree from 5.4 magnitude

Continued on page 2

Upcoming Events:

Deep Sky Observing Night - August 3

Public Star Party - August 9

General Meeting - August 16

Local Star Party - August 31

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

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The Backyard Astronomer

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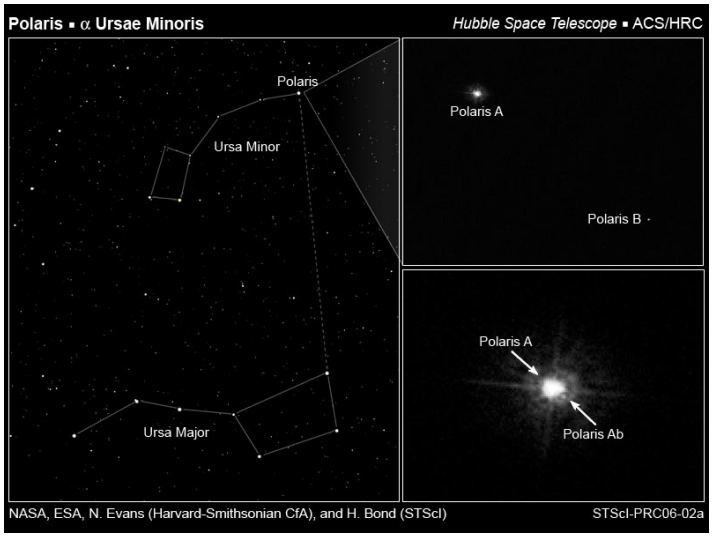
Sigma Octanis - not a very illustrious South Star).

Our second "North Pole" is that of the Solar System. This is referred to as the North Ecliptic Pole (NEP). By convention, Earth's orbit around the Sun denotes the plane of the Solar System, which is relatively flat.

The planet with the maximum inclination from Earth's is

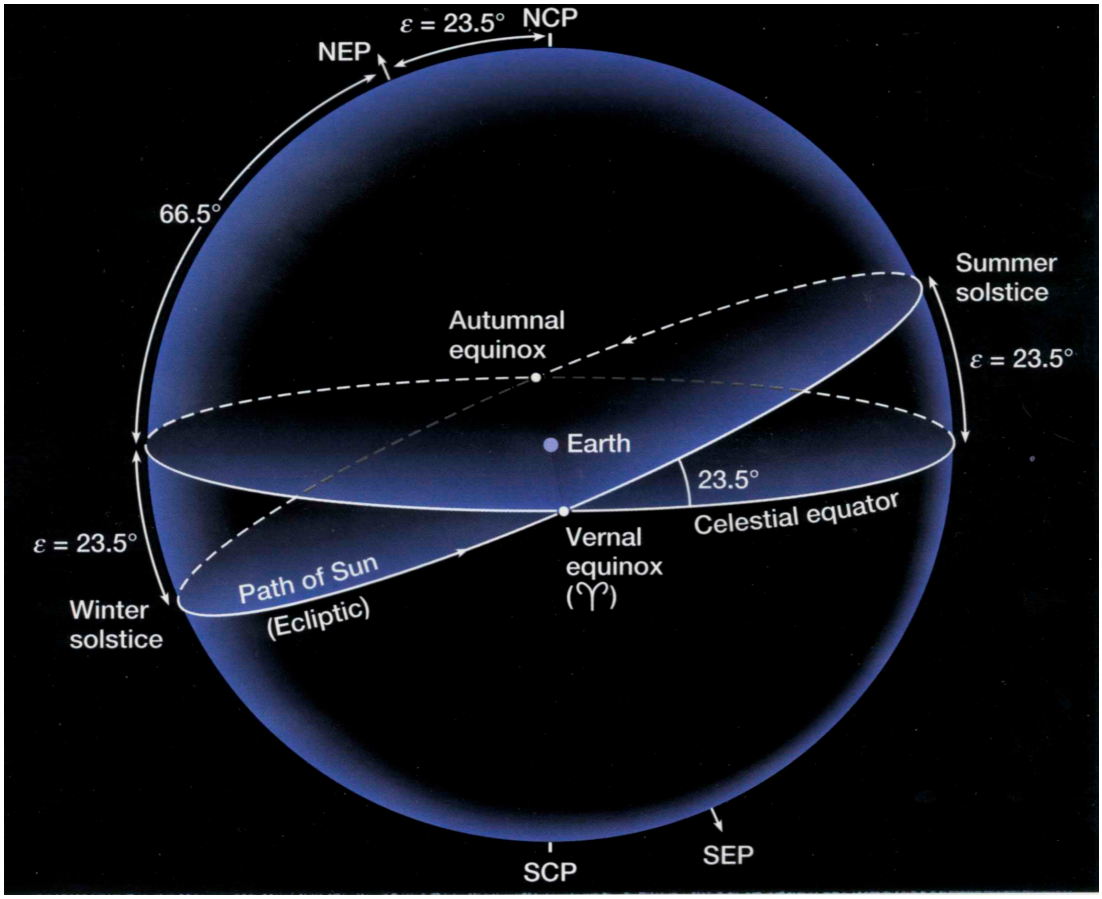


Mercury, at 7 degrees. The others are 3.4 degrees (Venus) or less. Pluto used to boast the largest inclination of 17.2 degrees, but the I.A.U. demoted it to Dwarf Planet in 2006.

A line perpendicular to the plane of Earth's orbit extended north to the celestial sphere arrives at a point very close to NGC 6543, a lovely planetary Nebula (The "Cat's Eyes Nebula") in Draco. The NEP is indicated in Sky Atlas 2000 on chart 3 and in Sky and Telescope's Pocket Sky Atlas' chart 51. (The South Ecliptic Pole is in Dorado near Eta Doradus).

Last, but not the least, is the North Galactic Pole (NGP). Like the Solar System, the Milky Way Galaxy, being a spiral galaxy, is fairly flat. So we can project a line perpendicular to its plane into space also. Where does it land? In Coma Berenices. Again referring to Sky Atlas 2000 (chart 7) and the Pocket Atlas (chart 45), about 6 degrees east of the Coma Berenices Star Cluster (MEL 111), you'll spy the star 31 Comae Berenices. The NGP is half a degree to its south. (The South Galactic Pole is in Sculptor near NGC 288).

It's interesting to note that all three of the above North Poles can be seen from the Northern Hemisphere from April through mid August evenings. An interesting exercise these evenings is to compare the different angles these poles make relative to each other. Please don't ask me where the North Pole of the Universe is!,



The Zero Gravity Coffee Cup

by Dr. Tony Phillips

High above our planet in the realm of satellites and space stations, the familiar rules of Earth do not apply. The midday sky is as black as night. There is no up and no down. Dropped objects do not fall, and hot air does not rise.

Of all the strange things that happen up there, however, it is possible that the strangest happens to coffee.

Physics professor Mark Weislogel of Portland State University has given a lot of thought to coffee (and other fluids) in space, and he describes what happens:

"For starters," he says, "it would be a chore just getting the coffee into the cup. Absent the pull of gravity, pouring liquids can be very tricky."

"But, for the sake of argument, let's suppose you are on the space station and you have a cup of coffee in your hand." The most natural thing would be to tip the cup toward your lips, but when you do….

Astronaut Cady Coleman performs a Capillary Flow Experiment interior corner flow test.

"The coffee would be very hard to control," he continues. "In fact, it probably wouldn't [come out of the cup]. You'd have to shake the cup toward your face and hope that some of the hot liquid breaks loose and floats toward your mouth."

On the bright side, you will probably be wide awake by the time the cup is empty.

Coffee is not the only liquid that misbehaves in space. Cryogenic fuels, thermal coolants, potable water and urine do it, too. The behavior of fluids is one of the most un-intuitive things in all of space flight.

This poses an extreme challenge for engineers designing spacecraft systems that use fluids. "Our intuition is all wrong," laments Weislogel. "When it comes to guessing what fluids will do in new systems, we are often in the dark."

To develop a better understanding of fluids in microgravity, Weislogel and colleagues are conducting the Capillary Flow Experiment onboard the International Space Station. For instance, one of the devices in their experiment suite looks at "interior corners." If two solid surfaces meet at a narrow-enough angle, fluids in microgravity naturally flow along the join—no pumping required. This capillary effect could be used to guide all kinds of fluids through spacecraft, from cryogenic fuel to recycled waste water. The phenomenon is difficult to study on Earth, where it is damped by gravity, yet on the space station large scale corner flows are easy to create and observe.

Weislogel and colleagues have already been granted three patents for devices invented as a result of their work. One is for a microgravity condensing heat exchanger. Another describes a device that separates and controls multiphase fluids. The third patent is for--you guessed it-- a low-gravity coffee cup.

Astronaut Don Pettit, who worked with the Capillary Flow Experiment during his time on board the ISS, helped invent the cup, and he shares the patent along with Weisogel and two mathematicians, Paul Concus and Robert Finns, who performed the first theoretical analysis of the phenomenon.

Basically, one side of the cup has a sharp interior corner. In the microgravity environment of the space station, capillary forces send fluid flowing along the channel right into the lips of the drinker.

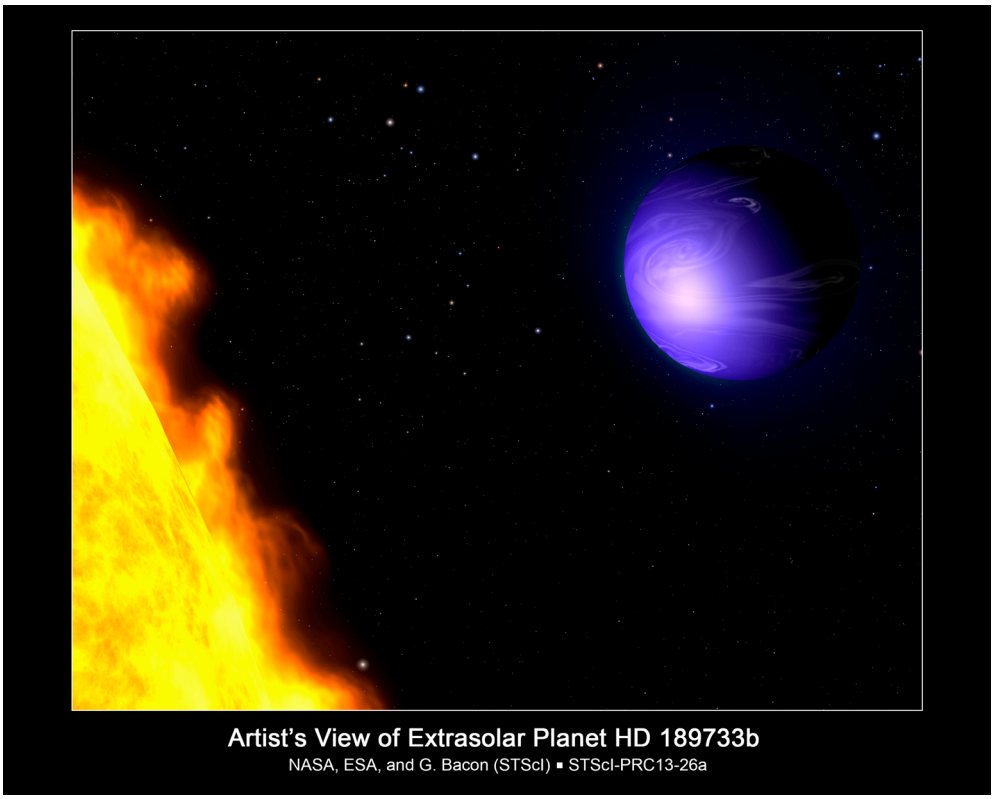
Don Pettit drinks from a zero-G coffee cup
Click HERE for a YouTube video

"As you sip, more fluid keeps coming, and you can enjoy your coffee in a weightless environment-- clear down to the last drop," says Pettit. "This may well be what future space colonists use when they want to have a celebration." Indeed, the patent application specifically mentions "toasting" as one of the uses of the device.

It's easy to imagine what they might be toasting: toilets and air conditioners and fuel tanks and recycling systems, working better thanks to capillary flow experiments on the ISS.

Credit: Science@NASA

Hubble Finds a Cobalt Blue Planet



Artist's View of Extrasolar Planet HD 189733b
NASA, ESA, and G. Bacon (STScI) ▪ STScI-PRC13-26a

Astronomers working with NASA's Hubble Space Telescope have deduced the actual color of a planet orbiting another star 63 light-years away.

The planet is HD 189733b, one of the closest exoplanets that can be seen crossing the face of its star, and its color is cobalt blue. If seen directly, this planet would look like a deep blue dot, reminiscent of Earth's color as seen from space.

Hubble's Space Telescope Imaging Spectrograph measured changes in the color of light from the planet before, during and after a pass behind its star. There was a small drop in light and a slight change in the color of the light. "We saw the light becoming less bright in the blue but not in the green or red. Light was missing in the blue but not in the red when it was hidden," said research team member Frederic Pont of the University of Exeter in South West England. "This means that the object that disappeared was blue."

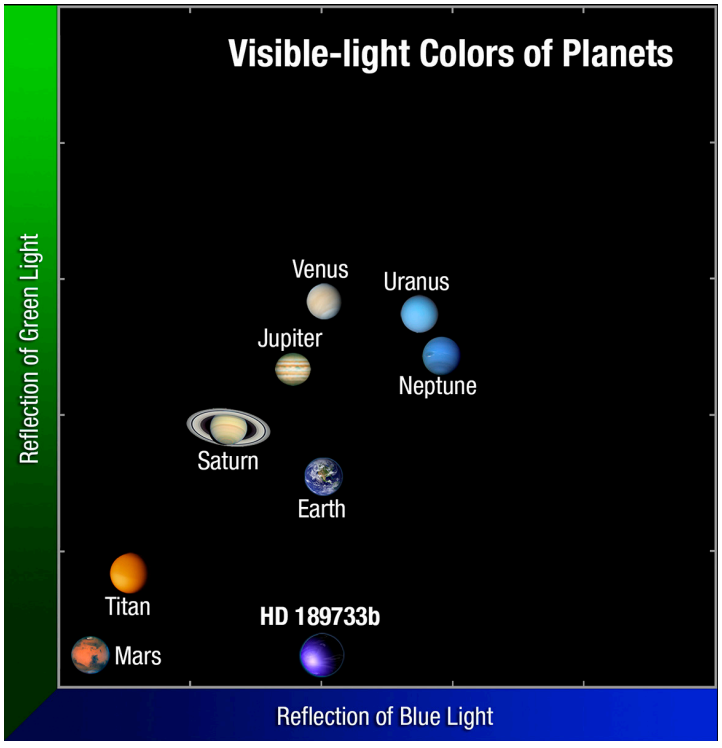
Earlier observations have reported evidence for scattering of blue light on the planet. The latest Hubble observation confirms the evidence.

Although the planet resembles Earth in terms of color, it is not an Earth-like world.

On this turbulent alien world, the daytime temperature is nearly 2,000 degrees Fahrenheit, and it possibly rains glass -- sideways -- in howling, 4,500-mph winds. The cobalt blue color comes not from the reflection of a tropical ocean as it does on Earth, but rather a hazy, blow-torched atmosphere containing high clouds laced with silicate particles. Silicates condensing in the heat could form very small drops of glass that scatter blue light more than red light. Hubble and other observatories have made intensive studies of HD 189733b and found its atmosphere to be changeable and exotic.

HD 189733b is among a bizarre class of planets called hot Jupiters, which orbit precariously close to their parent stars. HD 189733b was discovered in 2005. It is only 2.9 million miles from its parent star, so close that it is gravitationally locked. One side always faces the star and the other side is always dark.

In 2007, NASA's Spitzer Space Telescope measured the infrared light, or heat, from the planet, leading to one of the first temperature maps for an exoplanet. The map shows day side and night side temperatures on HD 189733b differ by about 500 degrees Fahrenheit. This should cause fierce winds to roar from the day side to the night side.



This plot compares the colors of planets in our solar system to exoplanet HD 189733b. The exoplanet's deep blue color is produced by silicate droplets, which scatter blue light in its atmosphere. Image Credit: NASA, ESA, and A. Feild (STScI)

Looking for that perfect weekend activity?

Why not resolve to getting involved?

Contact Dave Coshow to join the staff at GRCO

Email: grco@evaconline.org

18" Classic Obsession Telescope for Sale

Purchased new in 1997 with Galaxy optics. Selling to move to a different scope. Originally the mirror tested with a Strehl ratio of 0.955 (Fringe Centers) / 0.961 (Uniform Grid) and a RMS value of 0.034. It was refigured in 2000 by Swayze Optical to remove some zones. The mirror star-tests very well. All mirrors were recoated in the last 9 months by OMI (IBAD-96 Coating process). The woodwork does show cosmetic finish issues. There are numerous upgrades to the scope.
Asking $3,200 or best offer.

Contact me at 602.291.3508 or e-mail me if you want details. James.t.waters@cox.net

◯ New Moon on August 6 at 14:52

◐ First Quarter Moon on August 14 at 03:56

● Full Moon on August 20 at 18:45

◑ Last Quarter Moon on August 28 at 02:36

Upcoming Meetings

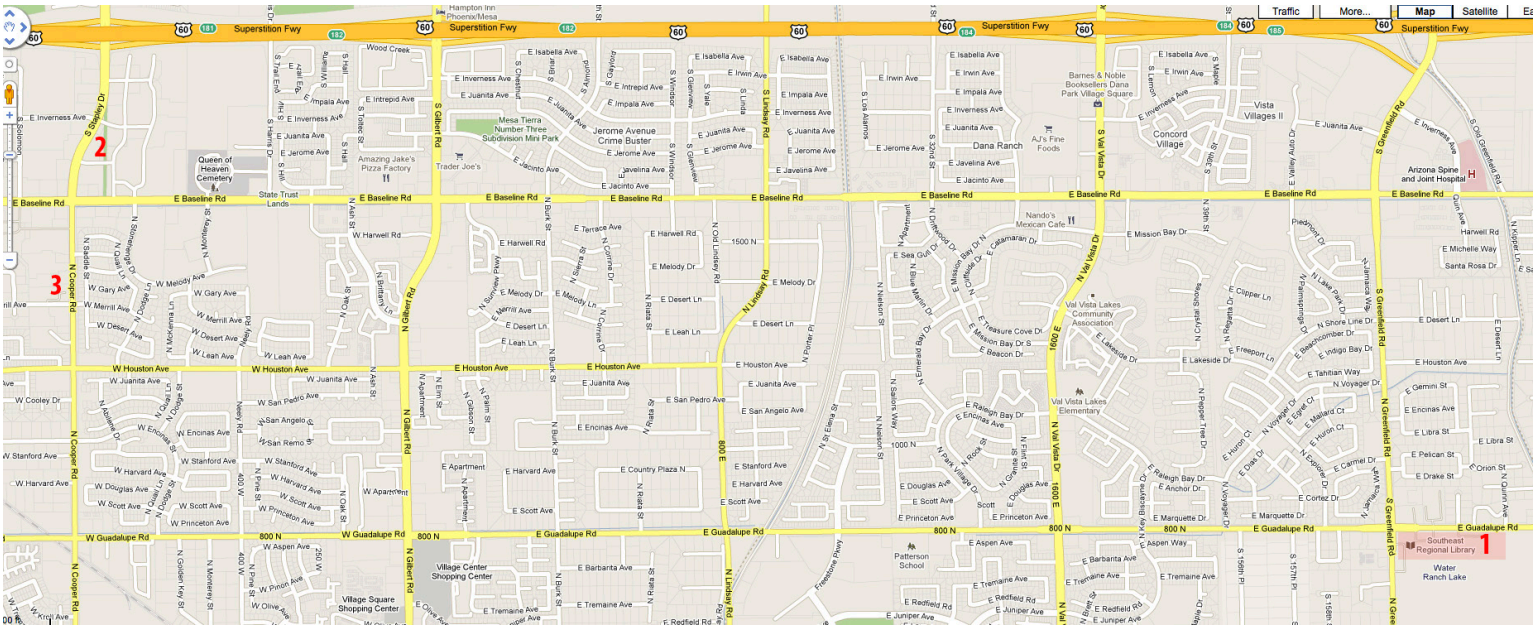
August 16
September 20
October 18
November 15
Holiday Party - TBD
January 17

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

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30 pm.

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

Visitors are always welcome!



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

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

August 2013

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

August 3 - Deep Sky Observing Night

August 9 - Public Star Party & SkyWatch

August 16 - General Meeting at SE Library

August 31 - Local Star Party

September 2013

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

September 7 - Deep Sky Observing Night

September 13 - Public Star Party & SkyWatch at Riparian Preserve

September 20 - General Meeting at SE Library

September 26 - Dobson Academy Star Party

September 28 - Local Star Party

East Valley Astronomy Club -- 2013 Membership Form

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

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

Select one of the following:

☐ New Member ☐ Renewal ☐ Change of Address

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

☐ **$30.00 Individual** January through March

☐ **$35.00 Family** January through March

☐ **$15.00 Individual** July through September

☐ **$17.50 Family** July through September

☐ **$22.50 Individual** April through June

☐ **$26.25 Family** April through June

☐ **$37.50 Individual** October through December

☐ **$43.75 Family** October through December

Includes dues for the following year

Renewal (current members only):

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

Name Badges:

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

Name to imprint: _____

Total amount enclosed: ☐

Please make check or money order payable to EVAC

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

Name: ☐ Phone: ☐

Address: ☐ Email: ☐

☐ Publish email address on website

City, State, Zip: ☐ URL: ☐

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

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

Areas of Interest (check all that apply):

☐ General Observing ☐ Cosmology

☐ Lunar Observing ☐ Telescope Making

☐ Planetary Observing ☐ Astrophotography

☐ Deep Sky Observing ☐ Other

Please describe your astronomy equipment:

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

How did you discover East Valley Astronomy Club? ☐

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

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

Liability Release Form

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

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

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

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

Please print name here ***Date***

Please sign name here

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

Inventing Astrophotography: Capturing Light Over Time

by Dr. Ethan Siegel

We know that it's a vast Universe out there, with our Milky Way representing just one drop in a cosmic ocean filled with hundreds of billions of galaxies. Yet if you've ever looked through a telescope with your own eyes, unless that telescope was many feet in diameter, you've probably never seen a galaxy's spiral structure for yourself. In fact, the very closest large galaxy to us - Andromeda, M31 - wasn't discovered to be a spiral until 1888, despite being clearly visible to the naked eye! This crucial discovery wasn't made at one of the world's great observatories, with a world-class telescope, or even by a professional astronomer; it was made by a humble amateur to whom we all owe a great scientific debt.

Great Nebula in Andromeda, the first-ever photograph of another galaxy. Image credit: Isaac Roberts, taken December 29, 1888, published in A Selection of Photographs of Stars, Star-clusters and Nebulae, Volume II, The Universal Press, London, 1899.

Beginning in 1845, with the unveiling of Lord Rosse's 6-foot (1.8 m) aperture telescope, several of the nebulae catalogued by Messier, Herschel and others were discovered to contain an internal spiral structure. The extreme light-gathering power afforded by this new telescope allowed us, for the first time, to see these hitherto undiscovered cosmic constructions. But there was another possible path to such a discovery: rather than collecting vast amounts of light through a giant aperture, you could collect it over time, through the newly developed technology of photography. During the latter half of the 19th Century, the application of photography to astronomy allowed us to better understand the Sun's corona, the spectra of stars, and to discover stellar and nebulous features too faint to be seen with the human eye.

Working initially with a 7-inch refractor that was later upgraded to a 20-inch reflector, amateur astronomer Isaac Roberts pioneered a number of astrophotography techniques in the early 1880s, including "piggybacking," where his camera/lens system was attached to a larger, equatorially-mounted guide scope, allowing for longer exposure times than ever before. By mounting photographic plates directly at the reflector's prime focus, he was able to completely avoid the light-loss inherent with secondary mirrors. His first photographs were displayed in 1886, showing vast extensions to the known reaches of nebulosity in the Pleiades star cluster and the Orion Nebula.

But his greatest achievement was this 1888 photograph of the Great Nebula in Andromeda, which we now know to be the first-ever photograph of another galaxy, and the first spiral ever discovered that was oriented closer to edge-on (as opposed to face-on) with respect to us. Over a century later, Andromeda looks practically identical, a testament to the tremendous scales involved when considering galaxies. If you can photograph it, you'll see for yourself!

Astrophotography has come a long way, as apparent in the Space Place collection of NASA stars and galaxies posters at http://spaceplace.nasa.gov/posters /#stars

If It's Clear...

by Fulton Wright, Jr.

Prescott Astronomy Club

Celestial events (from Sky & Telescope magazine, Astronomy magazine, and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is 1/2 degree or 30 arc minutes in diameter. All times are Mountain Standard Time.

On Tuesday, August 6, it is new Moon and you have all night to hunt for faint fuzzies.

On the night of Sunday, August 11, you might see some Perseid meteors. The show gets going in ernest about 10 PM (Moonset) and improves till about 4:15 AM (Monday) when astronomical dawn begins to interfere. The show should be nearly the same the next night. If you watch, under good conditions, for the hour before dawn, you might see 80 meteors. As is true with all meteor showers, there are no guarantees.

On Tuesday, August 13, at 11:18 PM, the first quarter Moon sets.

On Tuesday, August 20, at 6:48 PM (23 minutes before sunset), the full Moon rises, spoiling any chance of seeing faint fuzzies for the night.

On Friday, August 23, about 8:30 PM, you can see Saturn's moons all on the celestial east side of the planet. Titan (magnitude 9.3) is pretty far away, but the rest are clustered in close. Look for Rhea (magnitude 10.5), Dione (magnitude 11.3), Tethys (magnitude 11.1), and Enceladus (magnitude 12.7). Mimas (magnitude 13.7) is in there next to Enceladus but will be tough to spot.

On Tuesday, August 27, the Moon is at last quarter phase and rises at 11:18 PM.

Let's Party - August

by Fulton Wright, Jr. ~~~ Prescott Astronomy Club

Flashy, deep-sky objects, visible in the middle of the month, at the end of astronomical twilight (when it really gets dark, about 8:45 PM this month). This list is customized for Prescott, Arizona, should work well anywhere in the state, and be usable anywhere in the old 48 states.

Double Stars:

Zeta Ursae Majoris (Mizar), magnitudes 2.2 & 3.9, separation 14 arc-seconds, distance 86 light-years. 13h24m+54d56', 40 degrees up, to the northwest, in Ursa Major.

Epsilon Lyrae (Double-Double); Epsilon 1, magnitudes 5.0 & 6.1, separation 2.1 arc-seconds; Epsilon 2, magnitudes 5.3 & 5.4, separation 2.4 arc-seconds; separation of 1&2 210 arc-seconds, distance 162 light-years. 18h44m+39d40', 80 degrees up, to the northeast, in Lyra.

Beta Cygni (Albireo), magnitudes 3.4 (yellow) & 4.7 (blue), separation 35 arc-seconds, distance 430 light-years. 19h31m+27d58', 70 degrees up, to the east, in Cygnus.

Open Clusters:

M 11 (Wild Duck), magnitude 5.8, size 32 arc-minutes, distance 6.1 thousand light-years. 18h51m-06d16', 45 degrees up, to the south, in Scutum.

M 39, magnitude 4.6, size 29 arc-minutes, distance 1.1 thousand light-years. 21h32m+48d26', 50 degrees up, to the northeast, in Cygnus.

NGC 6231, magnitude 2.6, size 14 arc-minutes, distance 4.1 thousand light-years. 16h54m-41d49', 10 degrees up, to the south, in Scorpius.

M 7, magnitude 3.3, size 80 arc-minutes, distance 980 light-years. 01h22m-34d47', 20 degrees up, to the south, in Scorpius.

Globular Clusters:

M 5, magnitude 5.6, size 3.5 arc-minutes, distance 24 thousand light-years. 15h19m+02d05', 40 degrees up, to the southwest, in Serpens.

M 13 (Hercules), magnitude 5.8, size 3.4 arc-minutes, distance 23 thousand light-years. 16h42m+36d28', 75 degrees up, to the west, in Hercules.

M 4, magnitude 5.6, size 8.7 arc-minutes, distance 7.2 thousand light-years. 16h24m-26d32', 25 degrees up, to the south, in Scorpius.

M 22, magnitude 5.1, size 6.7 arc-minutes, distance 10 thousand light-years. 02h05m-23d54', 30 degrees up, to the south, in Sagittarius.

Galaxies:

M 81 & M 82, magnitudes 6.9 & 8.4, sizes 25x12 & 11x4 arc-minutes, 37 arc-minutes apart, distance 12 million light-years. 09h56m+69d04', 25 degrees up, to the north, in Ursa Major.

M 51 (Whirlpool), magnitude 8.4, size 11x7 arc-minutes, distance 27 million light-years. 13h30m+47d12', 40 degrees up, to the northwest, in Canes Venatici.

M 101, magnitude 7.9, size 29x27 arc-minutes, distance 22 million light-years. 14h03m+54d21', 45 degrees up, to the northwest, in Ursa Major.

M 106, magnitude 8.4, size 19x7 arc-minutes, distance 23 million light-years. 12h19m+47d18', 30 degrees up, to the northwest, in Canes Venatici.

Bright Nebulae:

M 17 (Omega), magnitude 6.0, size 46x37 arc-minutes, distance 4.2 thousand light-years. 18h21m-16d11', 40 degrees up, to the south, in Sagitarius.

M 20 (Trifid), magnitude 6.3, size 29x27 arc-minutes, distance 5.2 thousand light-years. 18h03m-23d02', 30 degrees up, to the south, in Sagittarius.

M 8 (Lagoon), magnitude 6.0, size 90x40 arc-minutes, distance 4.3 thousand light-years. 18h04m-24d23', 30 degrees up, to the south, in Sagittarius.

Planetary Nebulae:

NGC 6543 (Cat's Eye), magnitude 8.1, size 0.4x0.3 arc-minutes, distance 3.2 thousand light-years. 17h59m+66d38', 60 degrees up, to the north, in Draco.

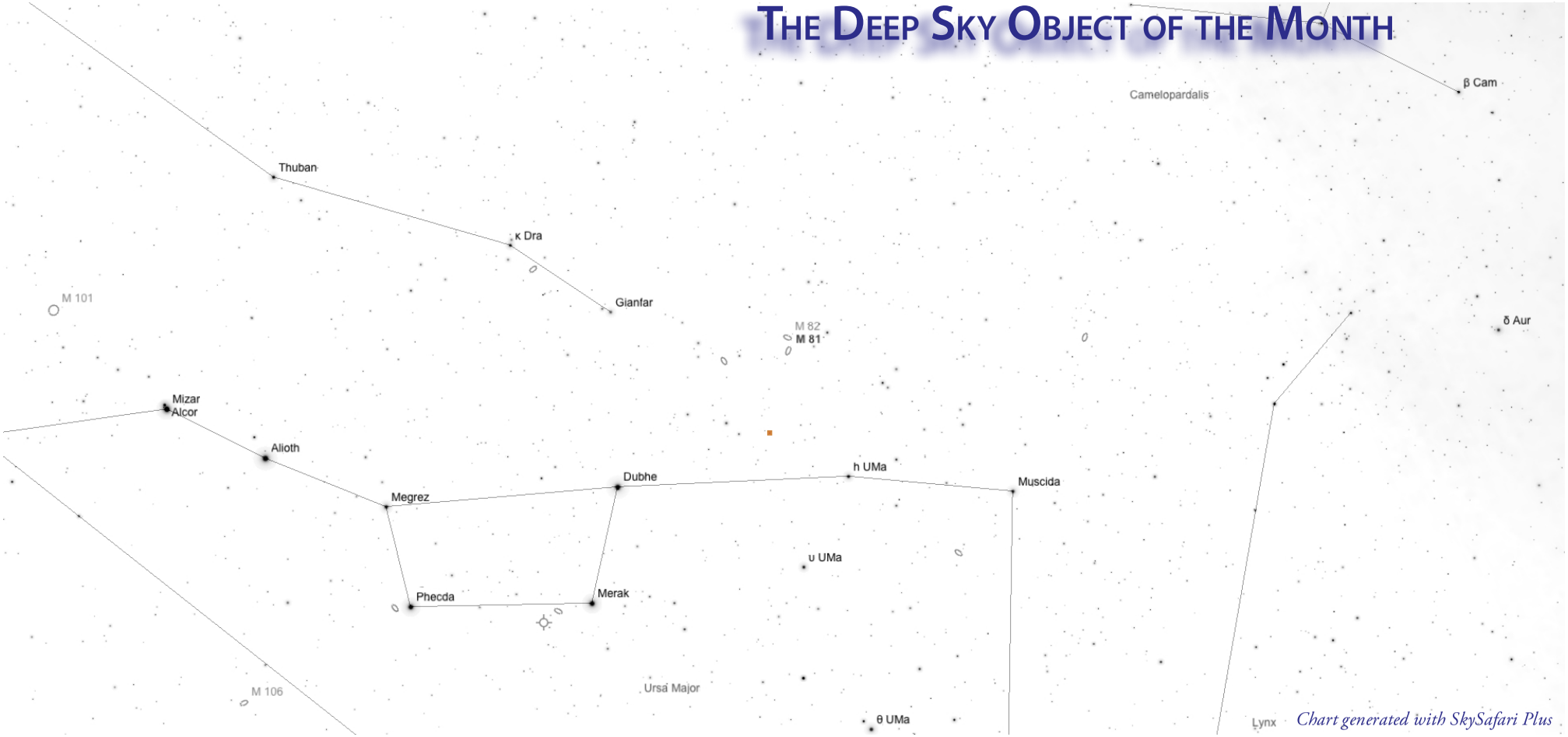
NGC 6826 (Blinking), magnitude 8.9, size 2.1 arc-minutes, distance 4.2 thousand light-years. 19h45m+50d31', 65 degrees up, to the northeast, in Cygnus.

M 57 (Ring), magnitude 8.8, size 1.4x1.1 arc-minutes, distance 1.4 thousand light-years. 18h54m+33d02', 75 degrees up, to the east, in Lyra.

M 27 (Dumbbell), magnitude 7.1, size 8x6 arc-minutes, distance 1.7 thousand light-years. 20h00m+22d43', 60 degrees up, to the east, in Vulpecula.

[This is a first draft of the second month of a year long project. I would be happy to get feedback. Did I make any mistakes? Did I leave out your favorite object? Is there information I should include or leave out? Do you have any other suggestions? Please write me at nancyfulton@cableone.net .]

The Deep Sky Object of the Month



Messier 81 (NGC 3031) in Ursa Major is one of the most conspicuous spiral galaxies in the sky. It forms a physical pair with its neighbor, M 82, and is the dominant galaxy of the M81 group. Discovered along with M 82 by Johann Bode, and sometimes referred to as Bode's Nebula, M 81 is one of the easiest and most rewarding galaxies for amateur astronomers in the northern hemisphere.

M 81 was first discovered by Johann Elert Bode, who found it, along with M 82, in 1774. Bode described it as a "nebulous patch", which "appears mostly round and has a dense nucleus in the middle." Pierre Méchain independently rediscovered both galaxies in 1779 and reported them to Charles Messier, who added them to his catalog in 1781.

With a total visual magnitude of about 6.8, M 81 can easily be found with binoculars and small telescopes. Under exceptional seeing conditions, it has even been glimpsed with the naked eye by experienced observers. M 81 appears as an elongated, diffuse 20′ x 10′ oval patch in small telescopes, its periphery of rather low surface brightness. With averted vision, broad, diffuse, indistinct spiral arms can be glimpsed.

Telescopes with apertures of 8 inches or larger are needed to distinguish structure in the galaxy, and show a striking example of a "grand design" spiral galaxy. Near-perfect arms spiral into the core, a blazing 3′ x 2′ oval containing a bright 30″-diameter nucleus. To the SSE of the core, separated from it by a dark gap, is a thin spiral feature. The spiral arm NNW of the core is wider and much shorter. Wide dust lanes stretch outward to the edge of the disk.

M81 (Bode's Nebula) Spiral Galaxy in Ursa Major

RA: 9h 56m 39.17s Dec: +69° 00′ 2.8″ Size: 24.9′ x 11.5′ Magnitude: 6.90

As one of the many benefits to becoming an East Valley Astronomy Club member, we have the following telescopes available for monthly check-out to current EVAC members:

8 inch Orion manual Dobsonian
8 inch Orion Intelliscope Dobsonian
60mm Tasco Alt-Azimuth Refractor

For more information, or to check out one of these scopes, please talk to:

David Hatch
EVAC Properties Director
480.433.4217

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