

This is NGC660 – a peculiar Polar-Ring galaxy imaged by Sam Saeed in October 2016 from our club site in Anza. This was done with a 10 inch Ritchey-Chretien telescope and QSI683 camera.

Upcoming Events - free and open to the public

Beginner's class	Friday, 3 May at 7:30 to 9:30 PM This is session 3 of the class: Covers methods of finding objects in the night sky.	ONLINE
Club Meeting	Friday, 12 April at 7:30 to 9:30 PM "What's Up?": John Garrett from TVA (inperson) Main speaker: Clint Bradford speaking on "How to Work Amateur Satellites with Your Handheld Radio"	IN PERSON at Chapman University and ONLINE
Open Spiral Bar	Saturday, 13 April at 10:00 to 11:30 PM Want to socialize? Grab your images, experiences, questions, or none and see your fellow Orange County Astronomers face-to-face.	ONLINE
Star Parties	Saturday, 7 April at the OCA Anza site. ??? Irvine site dates are yet to be determined	

The monthly club meeting is viewable in progress on Zoom and our social media platforms. The recording is available on these platforms after the meeting is over.

<https://twitter.com/OCAstronomers>
<https://www.facebook.com/OrangeCountyAstronomers>
<https://www.youtube.com/@ocastronomers>

Please consult the calendar on the OCA website to RSVP online meetings (required)

President's Message

By Barbara Toy

As I write this, the second Great American Eclipse is about two weeks away, and those of us who are traveling to see it are in the throes of getting equipment ready, packing and all the rest we need to do to get out the door and on our way to our planned viewing spots. From what I've been told, club members are planning to view this eclipse from a lot of different locations, from Mazatlan through many places in Texas and on up into more northern states. Alan and I will be in south-west Texas, where, statistically, the chances of clear skies are pretty good. It'll be interesting to hear about all the different experiences people have in all of their different viewing locations and also to see their images – of the eclipse itself and, I hope, its effect on their surroundings.

I haven't seen as much hype on this eclipse as I recall from 2017 – maybe I'm just not tuned in on the right media channels. A lot of people know about it, even without extra hype, and there's a general expectation that many areas along the path of totality will be inundated with folks coming in to view it. I hope the local governments have been able to take lessons from the 2017 eclipse and are better prepared for the traffic and other stresses from the large number of visitors than many areas were back then.

For those who aren't traveling to somewhere on the path of totality, I hope you'll view the partial eclipse from wherever you are. There are also a number of planned livestreams of the eclipse and other eclipse-related programs (see, e.g. Griffith Observatory's "Total Eclipse Watch 2024"), so there are good ways to share the experience even if you can't be there in person.

April General Meeting

Our April meeting is on the Friday evening following the eclipse (April 12) and we should have a full crew for the in-person part of the meeting at Chapman. John Garrett, our "What's Up" speaker, will most likely be there in person (and it's always a pleasure to have him!). Those of us who can't be there in person are planning to attend remotely from wherever we happen to be; it's great that we have that option, and I hope many of you are enjoying it, too.

The main talk this month is an unusual intersection of astronomy and ham radio, using ham equipment to control satellites for various helpful purposes. Check our website for more information – it looks like an interesting talk, whether you're a ham or not!

Weed Reminder

With the weather warming up after a wet winter, we can expect a bumper crop of weeds this year. They're usually easier to pull out or cut down when they're young, so now's the time to get started on weed control any time you're out at the Anza site. For safety, areas around pads and observatories need to be cleared, along with Anza House and the club observatory, and the various walkways on site as well. Thanks for any help you can give clearing the site!

© Barbara Toy, March 2024

Outreach

OCA needs a new outreach coordinator and other outreach volunteers.

Our traditional OCA Outreach program focused on events where volunteer club members brought telescopes to certain locations, generally schools or parks, for students, their families or members of the general public (depending on the location) to view through. The Outreach Coordinator was the contact for the schools or other entities that wanted to set up viewing events, managed the calendar, had a list of volunteers for these types of events, and would send out notices of upcoming Outreach events to the group of volunteers and determine who could cover the events that had been scheduled.

At the events, the Coordinator or someone designated by the Coordinator would handle the logistics for the club's part of the event – such things as making sure we had access to the viewing area, that we were setting up in the correct area, that area lights were out after the viewing started, etc. Jim Benet, who set up the program and streamlined how it was administered over the many years he ran it, has generously donated his software and other tools for handling all of these functions smoothly and easily. Although Jim handled all of the administration of the program himself, there is no reason that can't be handled by a team instead of a single person.

That's the kind of program we want to build again, an Outreach program that our club volunteers enjoy participating in as much as those who are doing the viewing. Are you interested in helping to get this kind of program going again? If so, we'd love to hear from you, whether you are interested in being the Coordinator for the program, in helping to administer the program in some other capacity, or in being a volunteer for Outreach events – please email OCA Secretary Alan Smallbone at Alan@ocastronomers.org.

Social Media Coordinator

If you enjoy social media and would like to help keep our accounts active, we are seeking a social media coordinator and would love to hear from you. We have a lot to tell people about OCA events and upcoming meetings as well as general astronomical information. We currently have Instagram, Facebook and X/Twitter accounts. There is a lot of flexibility in what can be done with this volunteer role. If you are interested, please contact our webmaster (also our Vice President), Reza AmirArjomand at Reza@ocastronomers.org.

AstroSpace Update

April 2024

Astronomy and space news summarized by Don Lynn from NASA and other sources

AstroSpace Update

April 2024

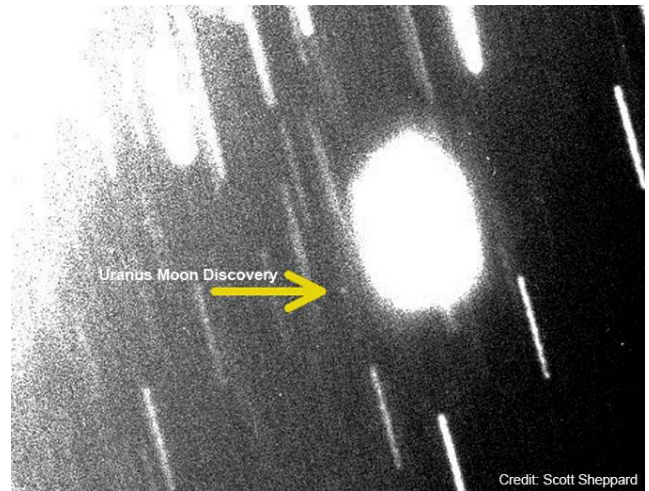
Astronomy and space news summarized by Don Lynn from NASA and other sources

SLIM Update – For the last two months I have reported here on the Japanese spacecraft SLIM, which landed on the Moon, though tipped on its side by a rough landing. It accomplished most of its mission goals before it was shut down as the lunar night fell. It was not designed to withstand the extreme cold and darkness of the lunar night, but luckily it did survive and was awakened after the next lunar sunrise and is resuming observations, at least when the sunlight hits its tilted solar panels.

Odysseus Update – Last month I reported here that the Odysseus lunar lander, developed by the Intuitive Machines company under contract with NASA, was on its way to the Moon. It landed near the Moon's south pole, but it tipped over, probably at a 30 degree angle (what are the odds of tipping over happening again?). Hours before landing the range-finder/altimeter was found not to be operating and so spacecraft controllers switched the guidance computer from using the range finder to using the lidar instrument during landing. Unfortunately, the lidar data was not processed fast enough in this configuration, with the result being that the lander was moving too fast horizontally when it reached the ground, breaking off one landing leg, causing it to tip. In spite of the problems, all but one of its technology and scientific payloads operated before the sun set on the landing site several days later.

Uranus, Neptune Moons – Searches using ground-based telescopes and ingenious stacking of multiple exposures have discovered a moon orbiting Uranus and two moons around Neptune. This brings the total known moons to 28 for Uranus and 16 for Neptune. They are quite faint and qualify as the dimmest moons of those planets discovered by Earth-based telescopes. All have huge orbits, resulting in their taking 2 to 27 Earth years per revolution. Each has an orbit similar to previously known moons, implying they broke off of larger bodies from collisions. Their sizes are estimated at 5, 9 and 14 miles in diameter.

Neutron Star From Supernova – Since the nearest supernova seen for centuries exploded in the Large Magellanic Cloud in 1987, astronomers have been searching the explosion remnant for either a neutron star or a black hole, one or the other of which should result. Explosion material has been obscuring the view. New observations with the James Webb Space Telescope (JWST) have found heavily ionized elements, including argon and sulfur, which would likely result from powerful X-ray radiation emitted by a neutron star, but not by a black hole.



Distant Galaxy – JWST observed a galaxy known as GN-z11, one of the most distant galaxies known. We are seeing it now as it was only about 340 million years after the Big Bang, when the light left it. It is extremely luminous, and the new observations appear to explain this. JWST found very dense gas near a black hole with about 2 million solar masses that is consuming that gas at such a rate as to appear so luminous. The gas has no substantial quantities of elements heavier than helium, so is probably primordial gas produced by the Big Bang, which may form first generation stars (known as Population III stars for historical reasons). Observations of this galaxy will continue.

Hubble Tension – The Hubble Space Telescope spent decades measuring the rate of expansion of the Universe, which is known as the Hubble Constant. The number it came up with is roughly 10% larger than the expansion rate calculated from analysis of the Cosmic Microwave Background, and this disagreement has been named the Hubble Tension. JWST observations have repeated the Hubble Telescope observations used to calculate the expansion rate, and the JWST work agrees closely with the Hubble Telescope work. The Hubble Tension remains.

Cold Brown Dwarf – JWST observed the coldest known brown dwarf. A star that failed to have enough mass to sustain hydrogen fusion (which powers ordinary stars) is termed a brown dwarf. This one is located just 7.43 light-years away. It is usually designated WISE 0855, because its full name has 23 characters. The temperature measured by JWST is 54°F, several degrees warmer than previous measurements. The new observations did not find phosphine, which has been seen in other brown dwarfs. Water ice clouds were also searched for, but the result was inconclusive. More work will be done on this brown dwarf.

Massive Black Hole Pair – Using archived data from the Gemini North telescope in Hawaii, astronomers calculated the masses of a pair of supermassive black holes orbiting each other, and found they qualify as the most massive black hole pair known, at a combined mass of 28 billion times the Sun’s mass. The galaxy is known as B2 0402+379. Normally it is thought that a closely orbiting pair of supermassive black holes will consume the stars nearby, and that causes the pair to spiral toward each other, ending in merging. However, this pair seems locked in a stable orbit, and has likely been that way for 3 billion years. The most likely explanation is that there aren’t enough stars nearby to be consumed and affect such massive objects. Likely the two black holes reached their huge masses by consuming most of the stars and other material around them before they encountered each other, leaving few stars to consume now.

Brightest Object – Observations of the brightest known quasar, dubbed J059-4351, show that it is consuming mass equivalent to our Sun every day. This huge consumption makes it glow 500 trillion times brighter than our Sun, setting the record for the brightest known object in the Universe. The black hole powering this quasar has a mass 17 billion times that of the Sun, making it one of the most massive black holes known. When it was discovered in 1980, it was mistaken for a star, but detailed observations last year showed it is a quasar. It is so distant that the light we see took 12 billion years to reach us.

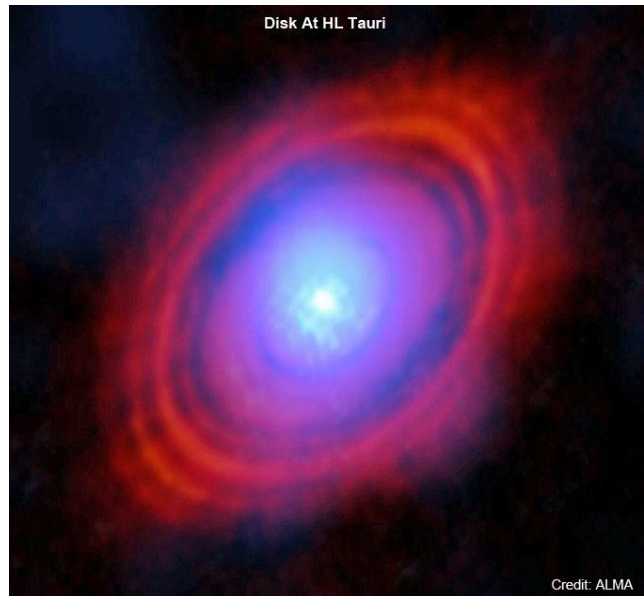
Supercluster Discovered – Our Milky Way galaxy is part of a very large structure known as the Laniakea Supercluster of galaxies, which is about 250 million light-years across. Astronomers have just found an even larger structure, which they have dubbed the Einasto Supercluster. It is 360 million light-years across and has a mass equivalent to 26 quadrillion Suns. It is the largest supercluster known. It is named after Jaan Einasto, an Estonian astronomer who studies large structures of the Universe.

White Dwarf Exoplanets – JWST has imaged two gas giant exoplanets orbiting white dwarf stars. Imaging exoplanets is rare because they are usually lost in the glare of their stars. Ordinary stars swell up to red giant stars and blow off planetary nebulas on their way to shrinking to white dwarfs. The newly discovered planets apparently survived red giant and planetary nebula phases of their stars. The planets’ masses have only been roughly estimated at a few times the mass of Jupiter. Their orbital distances are better known, at about 11 and 35 astronomical units (AU), where an AU is the Earth’s distance from the Sun. Before the red giant phase, these planets would have orbited much closer, at about 5 and 10 AU, about the same distances as Jupiter and Saturn are from our Sun. This is the first direct imaging of exoplanets similar in mass and orbital distance to the gas giants of our Solar System.

Possibly Habitable Planet – A recently discovered exoplanet, known as TOI-715 b, has been found to have a mass about 3 times that of Earth, placing it in the range that might be a large rocky planet or a small ice giant. In any case, it is orbiting its red dwarf star at such a distance that its temperature should allow liquid water on its surface. This condition is termed being in the habitable zone. It is located 137 light-years away. Further observations are planned to further characterize the planet.

Water Vapor – Astronomers have found water vapor in the disk around a young star that is likely where planets are forming. The amount of water detected is more than 3 times the water in all the Earth’s oceans. The star is HL Tauri, which is about 450 light-years away. The observations were made with the ALMA radiotelescope array in Chile. This discovery implies that planets might form with water originally, rather than collecting water after formation.

Distorted Exoplanet – In 2008 a ground-based survey discovered an exoplanet transiting in front of its star, and it was dubbed WASP-12b. It was found to be a Hot Jupiter, that is a planet roughly the size of Jupiter, but orbiting far closer to its star, which heated it. In fact, it orbits so closely to the star that tidal forces have distorted its shape considerably out of round. Its orbit is decaying, and the initial estimate was that it will spiral into its star in about 10 million years. A new analysis of transit and spectral data shows its orbit is decaying faster and has only about 3 million years left. It has 1.465 times the mass of Jupiter, orbits its star every 1.1 Earth days, and has a surface temperature of about 4200°F. Material tidally stripped from the planet has formed a disk around the star.



Active Dwarf Planets – One of the surprising findings when the New Horizons spacecraft explored Pluto is that it is geologically active. Spectral observations of two other dwarf planets, Makemake and Eris, show that they too are likely geologically active. The evidence for this is that the ratio of methane containing heavy hydrogen (deuterium) to methane with ordinary hydrogen is so low that it must be the product of geological activity.

T Cha Planetary Formation Finishing – Astronomers believe that at the end of planet formation, which goes on in a disk of gas and dust surrounding a new star, the remaining disk material is blown away by some process. New observations by JWST of the young star T Chamaeleontis (T Cha for short) show this dissipation of the disk is going on now. Atoms are being ionized by both ultraviolet and X-ray light. The ions are expanding rapidly away from the star. Expanding gases are part of a stellar wind driven by these high-energy forms of light. Material is being lost at about the rate of our Moon’s mass per year. This rate is in agreement with how long it takes for such a disk to dissipate.

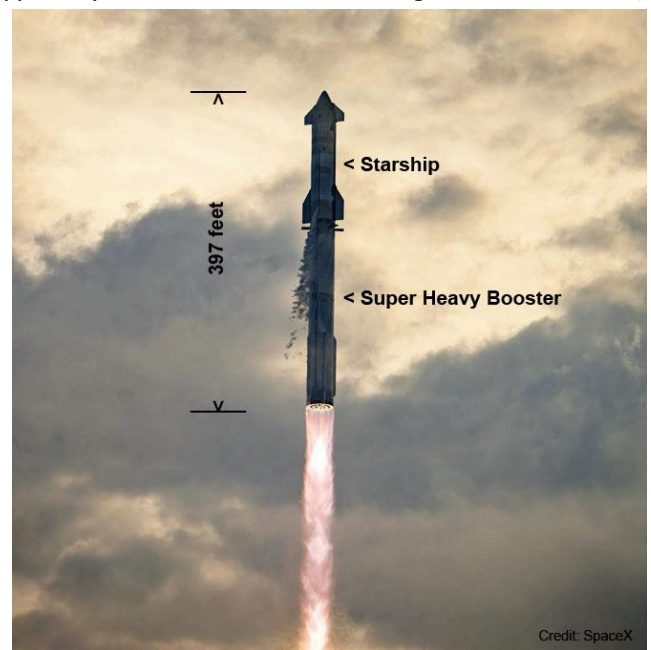
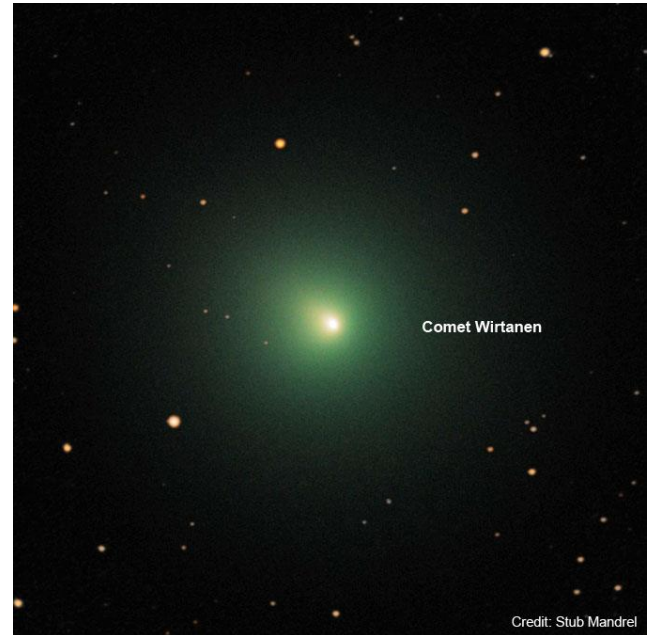
Meteor Shower – Scientists have discovered a new meteor shower. It has a similar orbit to Comet 46P/Wirtanen, so that is likely the source of its meteoroid particles. Earth passes through it on December 12. The radiant of the shower is in the constellation Sculptor, so the shower is being called the Lambda Sculptorids.

Distant Dust – Very few Solar System objects have been found beyond about 50 AU, so most astronomers believe that the Kuiper Belt ends at about 50 AU. The New Horizons spacecraft is about 80 AU from the Sun, and surprisingly its dust detector is still encountering dust there. This dust is probably a product of collision of objects in the Kuiper Belt. This implies either the Kuiper Belt extends far beyond 50 AU, or a farther belt exists, or else some unexplained force is pushing dust far beyond its source in the Kuiper Belt.

Europa Oxygen – It has been known for some time that charged particles stream along the magnetic field lines of Jupiter and strike, among other targets, the moon Europa. The particles break up water ice molecules on the moon’s surface, releasing hydrogen and oxygen gas. It is believed that some of the oxygen makes it down to the subsurface ocean, which would make the ocean a hospitable place for microscope life. The Juno spacecraft made a pass near Europa more than a year ago and for the first time measurements of the amount of oxygen and hydrogen being produced at the moon were made. Previous work had only been estimates of the rate these gasses are produced, and varied widely. Analysis of the Juno data says 26 pounds of oxygen per second are produced. Much of the oxygen remains at the moon helping to form a very thin atmosphere, while the hydrogen escapes to space.

Starship Flight – SpaceX test flew its Starship with Super Booster as a two-stage rocket for the third time. The first two test flights ended in explosions. This time Starship made it to near orbital altitude and speed (as planned) but burned up during reentry into the atmosphere when its deceleration rocket burn apparently failed. This rocket is the largest ever to take off, considerably heavier and more powerful than the Saturn V or SLS rockets. The flight also tested the opening and closing of the payload door and transfer of fuel in space. SpaceX is planning 6 more flights of Starship this year. They are contracted to NASA to have Starship ready by 2026 to land on the Moon and take off again as part of the Artemis program.

Active Centaurs Explained – Centaurs are asteroids orbiting between Saturn and Neptune (though some astronomers have defined Centaurs slightly differently). Though most Centaurs appear to be asteroids, roughly 10% of them are occasionally active; that is, they puff out a comet-like coma or tail. The cause of this behavior has long been debated. A new study purports to explain this. A team ran computer simulations of the orbiting of all known Centaurs for thousands of years. They found that many of their orbits change somewhat abruptly (over months or years), in what the team is calling “jumps”, due to gravitational encounters with Saturn or Jupiter. The jumps usually result in the bodies orbiting closer to the Sun than before jumping. All the Centaurs with known comet-like activity had undergone jumps. So these jumps and the resulting heating from being closer to the Sun are likely the cause of the activity.



Another Look - Leo and Leo Minor

April 2024
Dave Phelps

New Moon April 8 @1121, Full Pink moon the 23rd @ 1648.

In Old English it is the Moon after Yule and also the Snow moon.

Native American names include the Breaking ice Moon, Broken Snowshoe Moon, Budding Moon, When the Ducks come back Moon and when the Geese lay eggs Moon. In different parts of the continent, we find the Sucker Moon, Sugar Maker Moon and in the Dakota's, When the Streams are Navigable Moon.

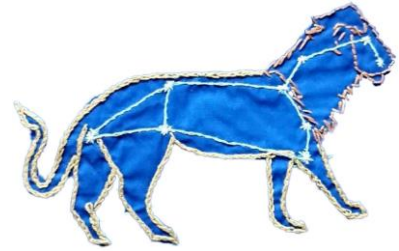
The Celts have Hare Moon and Growing Moon. In Spanish it's León y León Menor, in German Löwe und Kleiner Löwe. In French its Lion et Petit Lion, Italian Leone e Leone Minore and in Greek Its Λιοντάρι και μικρότερο λιοντάρι or Liontári kai mikrótero liontári.

April 6, lunar occultation of Saturn visible from Antarctica.

April 8 Total Solar Eclipse visible in the US

April 9, lunar occultation of Venus visible from Florida

This incredible image is an embroidery created by Professor Shirin Haque, Professor in Astronomy at the Department of Physics at the University of the West Indies on the island of Trinidad and Tobago. The embroidery was done to celebrate the naming of HD 96063 (host star) and HD 96063b (exoplanet) as Dingolay and Ramajay. Her website is found on: Prof. Shirin Haque | The Department of Physics (uw.edu)



Shirin Haque
<https://ras.ac.uk/media/932>

Leo Minor was created by the Polish astronomer Johannes Hevelius in 1687 and included it in his *Catalogus Stellarum Fixarum*. The constellation's name means "the smaller lion" in Latin. Hevelius created the constellation from 18 stars between the larger constellations Leo and Ursa Major.

In 1870, the English astronomer Richard A. Proctor renamed the constellation "Leaena", or the Lioness, in an attempt to shorten constellation names to make them easier to manage on star charts, but sadly, we have no lady lion constellation anymore.

Le Petit Lion contains two formally named stars. Those approved by the International Astronomical Union (IAU) are Illyrian-HD 82886 and Praecipua aka 46 Leonis Minoris. The Illyrians are a Balan people now inhabiting Albania. Illyrian has a planet named Arber, the original name for the Albanians.

Leo Minor has at this counting nine exoplanet systems, three of which are HD 87883, HD 82886 (G0D), and Kelt-3 (F2D).

Amateurs have been assigned objects imaged by Hubble and studied the objects to determine classification and characteristics. Hanny Van Arkel is a Dutch schoolteacher who in 2007 noticed an unusual object in an image from the Hubble. The image was of IC2497, an 11th magnitude spiral in Leo Minor about 4x4 arcmins in size. She discovered her Voorwerp as part of a project developed by Galaxy Zoo, a citizen/scientist program.

This image is by NASA, ESA, W. Keel (University of Alabama), and the Galaxy Zoo Team - <http://hubblesite.org/newscenter/archive/releases/2011/01/image/a/> (direct link), Public Domain, <https://commons.wikimedia.org/w/index.php?curid=12659883>

Hanny's Voorwerp is a quasar ionization echo. I have some links below to help you search for understanding.

https://en.wikipedia.org/wiki/Hanny's_Voorwerp#/media/File:Hs-2011-01-d-print.jpg and

<https://www.zooniverse.org/projects/zookeeper/galaxy-zoo/about/research>

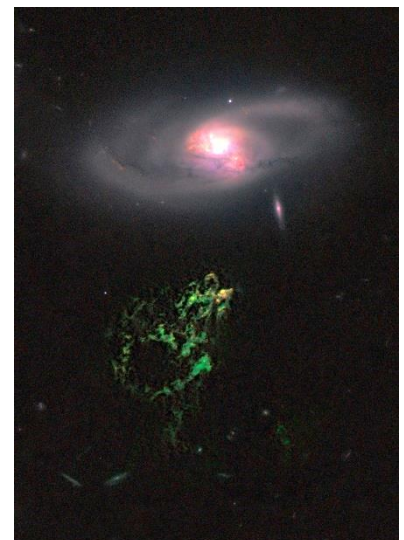
Read more about Galaxy Zoo at:

<https://www.zooniverse.org/projects/zookeeper/galaxy-zoo/about/research> and

<https://www.zooniverse.org/>

Check here for more images of quasar ionization echos or Voorwerpjes:

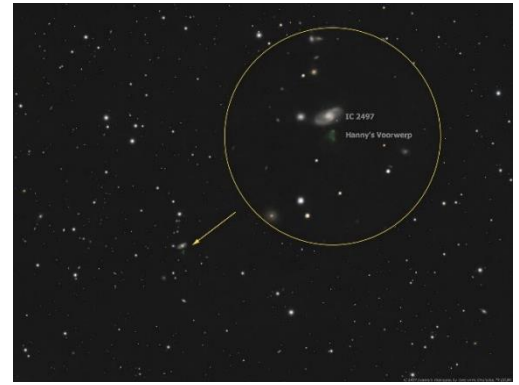
https://en.wikipedia.org/wiki/Hanny's_Voorwerp#/media/File:Extended_Gas_In_Active_Galaxies.jpg



I used the image by Gary Imm because I was looking for something close to what you will see visually. IC 2497's magnitude is in the 11's and the Voorwerp is around 17. But if you look at IC2497 telescopically you will see a galaxy with an active nucleus hiding a black hole about 10 million times the size of our sun. When the black hole was going crazy and created the Voorwerp, its size was 10 trillion times the size of our sun and just think, we get to look at it!

Going from the sublime to the sublime, Arp 107 is a pair of interacting galaxies in the process of merging. They have an apparent magnitude of 14.6.

https://www.flickr.com/search/?text=arp_107



Gary Imm

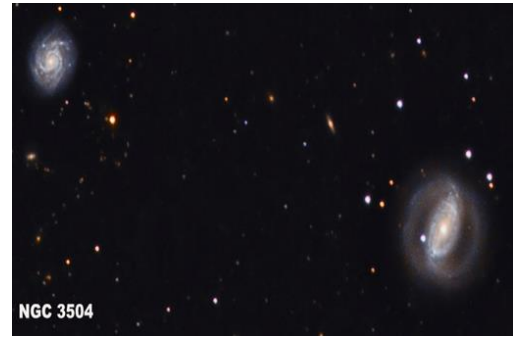
<https://www.astrobin.com/2efji6/?q=voorwerp>



NGC3003



NGC3344



NGC3504

<https://www.astrobin.com/search/?q=ngc+3003>

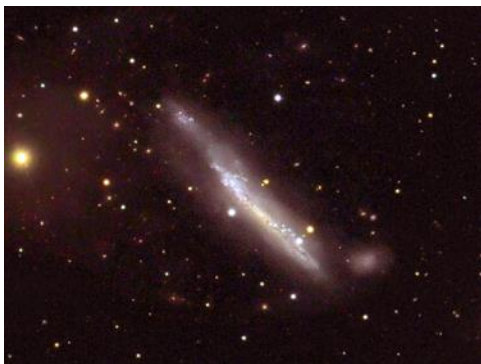
<https://www.astrobin.com/search/?q=ngc+3344>

<https://www.flickr.com/search/?text=ngc%203504>

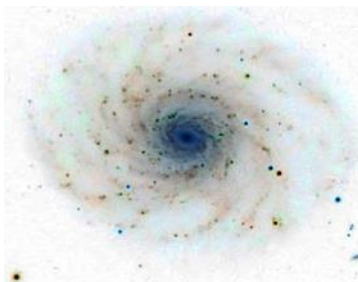
NGC 3003 is a barred spiral. It is 5.8 arc minutes in size and is about 12th magnitude, as you will see, it's almost edge-on. NGC 3344 is a spiral galaxy seen face-on. It is approximately 25 million light years distant and 7.1×6.5 arc minutes in size. It's about 10th mag. NGC 3504 is an 11th mag. barred spiral. It is a starburst galaxy, a region of massive star formation. Two supernovae were observed in the galaxy in recent years, one in 1998 and another in 2001. The other galaxy is 3512.

Mantrap Catalog

Arp 206 is NGC 3432/UGC 5983. 3432 is an intriguing object well worth additional study. NGC 3432, sometimes known as the Knitting Needle Galaxy, lies 3 degrees southeast of the star 38 Leonis Minoris. It appears almost edge-on and can be observed in amateur telescopes. It's about 11th mag. We call it a starburst galaxy because it is being disturbed by its neighbor, dwarf galaxy UGC 5983, that blot at the bottom right. U5983 is part of the focus this month: faint, dwarf galaxies. We are lucky in this one because the two are interacting. Be sure to study 3432 for bright variable outbursts, knots of star formation and, of course, its tail. 3462 is in the 11th magnitude but work hard to pick up U5983. By the way, a rule of thumb is that a 12.5 inch telescope can find every NGC object. U5983 is 17th magnitude. All things being equal and average, your 30" F/5 Dobsonian will just barely reach 17th magnitude. I you take an image of these guys, please let me know. Thanks, Dave



NGC3432



NGC3486



NGC2859

<https://www.astrobin.com/search/?q=ngc+3432>
<https://images.mantrapskies.com/catalog/NGC/NGC3486/index.htm>
<https://images.mantrapskies.com/search?designation=ngc+2859>

NGC 3486 is a nice almost appearing face-on galaxy. It is in the 10th magnitude range. I inverted the image to show the extended spiral arms and the bright specs of star formation, areas you can pick up. NGC 2859 is a little small, with an apparent magnitude in the 11's and about 4'x4'. It is described as a barred lenticular galaxy but its big deal is its ring.

The proper **names of stars** in Leo that have been officially approved by the International Astronomical Union (IAU) are: Adhafera—Arabic- Lock of hair, Algieba-Arabic Al jeb-bah- the forehead , Alterf- Arabic-the Glance.

Let it be noted that many of the Arabic names are for stars in their particular constellation of Leo, which stretched from Virgo through to Gemini: Chertan – Ribs, Denebola-*Deneb Alased* -tail of the Lion, Subra - right knee, and Zosma – girdle, Formosa, Formosa is the historical name of Taiwan used in the 17th century, meaning beautiful in Portuguese and Regulus-Prince or Little King,

There are over 50 exoplanetary systems in Leo, several named. Sagarmatha-**HD 100777**-is the Nepali name of Mt. Everest and the exoplanet revolving it was named as Laligurans, the Nepali name of the flower Rhododendron. The star HD 99109 is named Shama. The name was selected in the **NameExoWorlds** campaign by Pakistan, during the 100th anniversary of the IAU. Shama is an Urdu literary term meaning a small lamp or flame. The exoplanet companion is called Perwana, meaning 'moth' in Urdu, alluding to the eternal love of an object circling a source of light. Dingolay means to dance, twist and turn in elaborate movements, symbolizing the culture and language of the ancestors of the people of Trinidad and Tobago. Ramajay means to sing and make music in a Steelpan. The Steelpan is a musical instrument invented in Trinidad and Tobago. Noquisi is the Cherokee for star, Rasalas is the northern star of the lion's head. Noquisi and Awohali come from the Cherokee language, meaning "star" and "eagle," respectively. These are the first that a star or exoplanet has officially carried a name in the indigenous language of a North American people.

Leo I is 11.2 magnitude and is one of the most distant satellites of the Milky Way galaxy. It was discovered in 1950 on plates from the *Palomar Observatory Sky Survey*, taken with the 48-inch Schmidt camera. I found it rather easily in my 17.5. You will need to put Regulus outside the field of your eyepiece. This technique was used by OCA's own Barbara Toy and her team to observe Sirius B. Leo I could be the youngest dwarf spheroidal satellite galaxy of the Milky Way. Just look at that image, ain't it pretty ?



<https://www.flickr.com/search/?text=Leo I galaxy> Tom Wildoner
<https://www.flickr.com/search/?text=Leo II galaxy>

Leo II will be harder. It is smaller and dimmer but still findable. Last I read, Leo II and apparently most dwarf galaxies have very high stellar masses but relatively low stellar counts. Professionals are positing they are the best source to study Brown dwarfs and the enigmatic Dark Matter.



The other dwarf galaxies in Leo are challenging or unobtainable to most of our amateur telescopes. When you get an opportunity to use some big glass under a dark sky, try them out. Leo III, also known as Leo A, is mag 12 but I never searched for it. It is also metal poor and irregular. Leo III is a see-through galaxy. I couldn't find any amateur images of Leo III, Leo VI, Leo V and Leo T. You will find an image of Leo III taken by Subaru. Leo IV and V are down near the southern tip of Leo under his rear paws. Leo IV is a dwarf discovered in 2006 by the Sloan Digital Sky Survey. It has an approximately round shape.

<https://apod.nasa.gov/apod/ap041110.html>. Also look at this image by Judy Schmidt on flickr.
<https://www.flickr.com/search/?text=Leo III galaxy> a Hubble image amateur processed by Judy Schmidt

Leo IV and Leo V are two of the smallest and faintest satellites of the Milky Way. When dark matter is discussed in reference to these two galaxies, it's because each galaxy shines with only about 10 or 15 thousand times the luminosity of our sun but have masses of 1.5 million in the case of Leo IV and 330,000 in the case of Leo V. I have seen a Hubble image of IV but V is apparently made of unobservableium.

Much like VI and V, faint, sparse and metal poor, Leo T is found under Leo's nose. It was discovered by the Sloan survey. It's probably less than 16th. Once again, T has a mass to light ratio of about 140, making it another prime candidate for dark matter.

Dark Skys Dave

This article was abbreviated by the editor to fit the space available.

Advertisements

Buy, Sell or Trade some of your gear? This is where club members can place advertisements. Please contact the editor at newsletter@ocastronomers.org to place an advertisement or to learn more about placing one. There is no cost to club members for non-commercial advertisements in the newsletter.

Each advertisement may be run for 3 consecutive issues, after which it will be removed. The advertiser may resubmit it for inclusion after a one-month hiatus.

For Sale	contact	Ron Choi	rchoi1983@gmail.com	
• Orion StarShoot AutoGuider			further reduced price	\$ 200
• Tele Vue 8mm plossl 1.25" eyepiece				\$ 80

For Sale	contact	Val Akins	akins7821@gmail.com	949-301-5956
• Telescope: Orion's Sirius 8" Go-To Reflector, Focal Length: F6, 1200 mm, Case: for 8 x 6 OTA				\$ 450 reduced
Mount: Sirius EQ-G Go-To Equatorial with tripod				
Controller: Synscan 42,000 Celestial object database				
Lens: Siriusplossl 26 mm				
Viewfinder: 8 x 50 mm Rt. Angle				
Note: Equipment is used, but all functional				

For Sale	contact	David W. Pearson	p.davidw@yahoo.com	
• Star Splitter 20 inch Dobsonian telescope with servo-cat go-to capability				\$ 6000 obo
Includes 8 eyepieces, laser collimator, telerad, plus more.				
The equivalent bought today from Obsession would be \$15,385+shipping without extra accessories.				
This item is local pickup only. If interested, please send me email requesting a complete description.				

For Sale	contact	David W. Pearson	p.davidw@yahoo.com	
• Sky-Watcher Star Adventurer astro pkg (no Wi-Fi), Star Adventurer DEC bracket, Latitude base, and counterweight. Motorized equatorial mount w dial selectable lunar, solar and star tracking modes. Vixen-style dovetail saddle, integrated polar scope with illuminator, shutter interface control for compatible DSLR's, ST-4 Auto-Guider port, mounts via 3/8- or 1/4-inch tripod threads, 11 lb payload. Runs on four AA batteries or Mini USB port for external power and updating FW.				\$ 200
This item is local pickup only. If interested, please send me email requesting a complete description.				

For Sale	contact	David W. Pearson	p.davidw@yahoo.com	
• Sky-Watcher S21110 AZ-GTi Mount (no tripod). Multi-purpose alt-azimuth go-to mount, 11-lb payload, Vixen-style dovetail. Spring loaded worm gears and Freedom Find™ dual-encoder technology. 42,900+ object database, Sidereal, lunar, and solar tracking speeds. Controlled with SynScan Pro app for iOS and Android. Built-in Wi-Fi, DC operation.				\$ 250
This item is local pickup only. If interested, please send me email requesting a complete description.				

For Sale	contact	David W. Pearson	p.davidw@yahoo.com	
• DWARF II Smart Telescope (Deluxe). Compact & Ultra-Portable. Smartphone Control, One-Click GOTO, AI-Powered Object Tracking, auto star Tracking & stacking, Gigapixel Panorama. Replaceable Battery & Type-C Charging. Includes 64GB microSD Card, mini tripod, Carrying bag, filter adapter, UHC filter, ND solar filter (2).				\$ 300
This item is local pickup only. If interested, please send me email requesting a complete description.				

For Sale contact Roger Mills 909-627-4122

- 8 inch pyrex mirror plank ground and polished to f/7 with polishing tool and materials \$ 200 obo
- Fiberglass telescope tube 9.25 inch O.D., tube rings, equatorial mount, synchronous drive, counterweight, Book: "Making Your Own Telescope" by Allyn J. Thompson.

The mirror has not yet been figured to parabolic shape

For Sale contact Nick McMillan wforacer@rocketmail.com

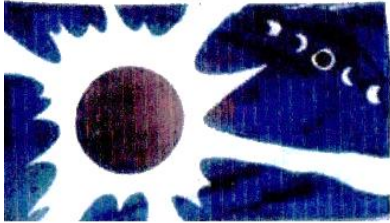
- Technical Innovations Pro-Dome Ten-Foot (PD10), includes three Wall-Ring-PD10 (WR10) which add ~48" height to the walls and making it 10' tall and 10" wide. \$ 5000
- Digital Dome Works controller (DDW), hardware and software.
- Electric Dome Motors 10 (ED10), Electric Shutter Motor 10 (ES10), Shutter Auto Stop (SS1).
- Power Supply 10 (PS2E), ES Pulley upgrade (ESP), Wind Restraint System, Anti Sag Brace.

Pictures are on Flickr here: <https://www.flickr.com/photos/123906448@N08/albums/72177720309596327/>.
The dome and components must be picked up in Costa Mesa.

For Sale contact Kandra Kargo teapotsagit@earthlink.net 714-349-9137 cell

- Total Solar Eclipse Flag is back! Take one with you to Texas (or Mexico) next April 2024! \$ 45 + S&H

Limited supply from Teapot Sagittarius. American made. Call or text for more information and to order.



For Sale contact Jerry Floyd jlfloyd720@gmail.com

- Celestron CG-11 scope (Losmandy G-11 Equatorial Mount with Celestron C-11 Telescope) \$ 1000

No tripod
High-precision brass worm (purchased as upgrade from Losmandy), Gemini-1 control unit including motors, Counterweights, Finder-scope, Telrad finder, dew shield for telescope

Originally purchased as a single assembly in 1996; little used in the past few years but in good shape
Can demo if interested, but you would have to come to my observatory at the OCA Anza site
These items are for local delivery in Southern California only. If interested, contact me for further information.

For Sale contact Richard Brennan 562-480-7215 cell dickbrennan101@yahoo.com

- Losmandy D-series dovetail rail and adjustable rings. \$ 160

DM8 + DR100 with 2 radius blocks. r mounts and rings for same.

- Meade Equatorial SuperWedge, hand-knobs for all adjustments, azimuth adapter for tripod, central nut with compass, LX200 base hex mounting screws, and Teflon tripod washer \$ 175

10" dia. x 1/8" (Jim's Mobile).

- QHY 5L-II-M Planetary/Guide CMOS camera, like new. \$ 70
- Meade 644 flip mirror \$ 70
- SBIG ST-237 cooled camera with filter wheel, processor, software, relay box, and DB-25 cables. \$ 60

The Windows XT computer is what is missing. SBIG hasn't supported this cooled camera for many years.

For Sale	contact	Vance Tyree	626-372-4856	vctyree@verizon.net	
					\$ 2500
<ul style="list-style-type: none"> • iOptron CEM60EC mount with encoder on RA axis, hard case • iOptron model 8030 portable pier 48 inch height • iOptron 2 inch tripod, model 8021ACC with carry bag • 21 lb counterweight 					
<p>The mount handles optical payloads up to 60 pounds. It has unguided periodic error of 0.5 arc-sec (RMS). I used this mount without auto-guiding with sub-exposure times of up to 300 seconds without showing any star trailing in RA or DEC when the polar alignment was within 1 arc-min or better. Closest equivalent mount today is CEM70EC which costs \$4400.</p>					
<p>The portable pier has a 6" diameter vertical tube (48 inches tall) equipped with removable legs and turnbuckle braces making a very rigid structure that has a 46 inch maximum leg spread and screw jacks for leveling.</p>					

For Sale	contact	Steve Borgens	408-500-2628	steveborgns@yahoo.com	
					\$1900
<ul style="list-style-type: none"> • TPO 10" Truss Tube f/7.9 Ritchey Chretien Reflecting telescope • Astro-Physics CCDT67 Tele Compressor (brings scope to 1500mm FL @f5.9) • Starlight Inst. Howie Glatter Laser Collimator - 2" / 635 nm-Large Threads • Orion 2 inch Star Diagonal 					
<p>All listed equipment are in excellent condition. \$1900 includes all items.</p>					

For Sale	contact	Dave Cook	949-689-0853 cell		
					\$ 500
<ul style="list-style-type: none"> • CELESTRON MOUNT, Advanced Series GT-5 Go-To equatorial mount and tripod • Includes full mount, hand controller, tripod, 11 lb. counterweight, CG-5 polar alignment scope, 115-volt AC and 12-volt DC auto lighter power cords, CG-5 polar alignment scope, hard-copy Celestron Instruction Manual 					
<p>Mount is autoguider capable, capacity about 30 lbs, will carry Celestron CE-11 OTA, Saddle fits both Celestron CGE and Losmandy rails, Go-To catalog contains approximately 45,000 celestial objects. Current equivalent mount is Celestron Advanced VX mount, price new \$1179.</p>					

For Sale	contact	Dave Cook	949-689-0853 cell		
					\$2600
<ul style="list-style-type: none"> • MEADE LX200 GPS, 10-inch diam. mirror • Includes heavy-duty mount and tripod, 10-inch OTA, Heavy-duty optional equatorial wedge, 115-volt AC to 12-volt power adapter, all normal accessories • Accessory & eyepiece utility tray, padded soft carrying case, soft dew shield, 1-1/4 90-degree diagonal • Peterson Engineering modifications: ball-bearing focuser mod, precision brass drive gear mod 					
					\$ 150
<p>This system can be used in either azimuth or equatorial mode. Mount and telescope just returned from Meade factory mechanical/electrical refurbishment and update costing \$500+ (still in shipping box from Meade). Current equivalent Meade LX200, 10-inch GPS, priced new is \$5899</p>					
<p>Note: This is my favorite telescope, but due to anti-cancer drugs, I no longer have the strength to singlehandedly maneuver this system.</p>					

From the Editor	
Due dates for submission of articles, pictures and advertisements	
<u>Issue</u>	<u>Due date</u>
May	20 April
June	25 May
July	22 June

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