SIRIUS ASTRONOMER

www.ocastronomers.org

The Newsletter of the Orange County Astronomers

August 2023 Free to members, subscriptions $12 for 12 issues **Volume 50, Number 8**

IC410 nebula featuring the "Tadpole" structures. This image was captured by Bill Warden in December 2009 and January 2010 from a location in Los Alamitos, CA using narrow band filters, StarXpress H9 camera, and Takahashi FS102 refractor.

Upcoming Events - free and open to the public

Beginner's class	Friday, 1 September at 7:30 to 9:30 PM **ONLINE** This is session 1 of the class: Overview of celestial objects, current scientific understanding of the Universe's beginning, present and future.
Club Meeting	Friday, 11 August at 7:30 to 9:30 PM **In person** at Chapman University and **ONLINE** "What's Up?": John Garrett from Temecula Valley Astronomers Main speaker: Michela Mapelli from University of Heidelberg on the topic "A Journey Through Binary Black Holes".
Open Spiral Bar	Saturday, 12 August at 10:00 to 11:30 PM **ONLINE** Want to socialize? Grab your images, experiences, questions, or none and see your fellow Orange County Astronomers face-to-face.
Star Parties	Saturday, 13 and 19 August 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, we're having our first Southern California heat wave for this summer, featuring very high temperatures inland, and (not coincidentally) our first major Southern California fires. Four fires broke out on Friday, July 14 in the Moreno Valley area of Riverside County. That night most of the smoke seemed to be at higher altitude. Even a thin haze of smoke affects viewing and imaging conditions, and I understand that those who were out at Anza at the time shut down early once they became aware of the smoke, because of the effect on the sky quality and to protect their equipment.

Smoke at ground level isn't good for lungs or optical surfaces, and we had some reports of stinging eyes from smoke from people who were at Anza that Friday night and Saturday morning. The excessive heat that was forecast for the day of the Starbecue would really cut into the joy of a party as well as causing health risks. Given the combination of high heat and smoke along with the forecast of high, thin clouds through most of that night and the fact that it was unlikely many members would really want to make the long drive out there under these conditions (if they were aware of them), we decided it was best to bite the bullet and cancel the Starbecue. From information currently available, it's unlikely that conditions will be better in August, so we'll hope for better luck next year.

Most people who head out to Anza check on the weather forecasts beforehand, though we're usually looking at factors like cloud cover and seeing. In recent years the smoke forecast has become another factor to consider, and fortunately there are services that provide that information, including the Clear Sky Charts you can reach from our website. At this point the Anza Clear Sky Chart has a row showing expected smoke conditions for Anza, and the Chart also has a link to the NOAA smoke map (which itself has a link to a zoomable version of the smoke map), if you want to see the broader smoke picture. Unfortunately, it looks like that will remain an important consideration for viewing and imaging for the next few months. I do hope none of you or any of your loved ones are more directly affected by any wildfires this season beyond the inconvenience of some high smoke…

July General Meeting with Christopher Go

Although there were a few interface issues, our July meeting went forward with commendably few technical difficulties. Christopher Go, our speaker, was giving his talk in person from Chapman Auditorium, and using his own computer, a scenario that had caused some problems in past meetings with different speakers, but it looks like we (by which I mean primarily John Hoot, Sam Saeed and Doug Millar, all of whom have contributed a lot to working out the bugs in our interface with Chapman's system) finally have a pretty reliable set-up for our meetings.

Chris Butler did the What's Up presentation, also in person, so we had both speakers there, on the ground, almost like pre-Covid times, which was pretty exciting (and it's always so much fun to see Chris in action!). Although the attendance on the ground wasn't up to pre-Covid levels, I'm happy to report that we did have more people come out for this meeting than for other recent meetings. Hopefully that trend will continue even when we don't have speakers there in person. Thanks to Helen Mahoney and Doug Millar, the donuts and coffee are excellent, and enjoying the snack table and its associated camaraderie is something you can't do virtually. The library is also something you can't enjoy virtually, and it looked like a lot of people were taking advantage of the chance to browse the collection that night.

Near the end of Mr. Go's talk, he mentioned the planetary imaging group he is involved in, and specifically that, although they have a number of people in the group from the continental United States, they don't have any in California. The purpose of the group is to collect data on various planets regularly for scientific purposes, as amateurs have a lot more opportunities to observe and image the planets than professionals do. If you're interested in getting involved with that kind of work and having a broader impact with your planetary imaging than just the aesthetic pleasure of good pictures, please contact him for more information. I don't have his email address myself, but if you want to contact him about this, Reza should be able to assist you.

The talk for our August meeting is on a different but equally exciting topic, binary black holes. Not that many years ago there was a serious question about whether black holes even existed, and in a pretty short period of time we've gone from establishing their existence to developing the means to learn more about their actual characteristics and effects on their surroundings. Our speaker, Michela Mapelli, is at the forefront of that research. She's currently a professor at the University of Heidelberg in Germany and will be addressing us from there – a real benefit of our current ability to have speakers virtually. John Garrett from the Temecula Valley Astronomers will be doing the "What's Up", though I don't know yet if he'll be coming to Chapman in person or giving his presentation virtually. Either way, it's a pleasure to have him, and the entire program should be fun and informative. I hope to see you there – in person or online!

I've seen projections that August will be even hotter than July. I hope all of you and your loved ones stay safe from the effects of the heat in what is already a record-breaking year, and that you're able to enjoy your astronomical activities safely despite it!

AstroSpace Update

August 2023

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

Early Cosmic Web – Galaxies are generally found to lie along strands of what is known as the cosmic web. Astronomers using the James Webb Space Telescope (JWST) have found 10 galaxies lying along such a strand that existed only 830 million after the Big Bang. We are seeing these galaxies as they were so long ago because their light took this long to reach us due to great distance. A quasar (a supermassive black hole actively consuming matter) was found within the string of galaxies. It is believed that such strands of galaxies later develop into massive galaxy clusters. The discovery was made during a study of the earliest black holes. Also found in the study were other very distant galaxies having central black holes that range in mass from 600 million to 2 billion times the mass of our Sun. Astronomers cannot yet explain how black holes could have grown so massive so soon after the Big Bang.

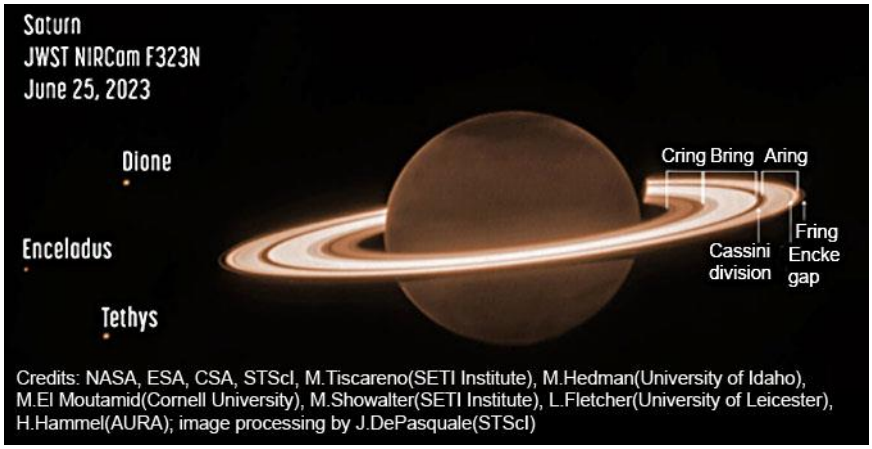
Central Black Hole Masses – Other JWST images show a pair of galaxies with supermassive central black holes as they appeared 860 million years after the Big Bang. The larger of these galaxies has a mass of 130 billion times the Sun's mass, while its black hole is 1.4 billion Sun's masses. Interestingly, the ratio of the galaxy mass to its black hole mass is about the same in both of these newly found galaxies as that ratio (galaxy mass to black hole mass) is in galaxies seen today. It was hoped that measuring masses in these developing galaxies would show whether the black holes or the galaxies themselves grew faster. That would tell astronomers something about how galaxies and black holes grow. The implication of the new measurements is that the masses of both the central black holes and their galaxies grow in lock step. The study plans to measure masses of more very distant galaxies and their central black holes to better understand their growth.

Most Distant Active Black Hole – Astronomers using JWST have discovered the most distant actively feeding supermassive black hole known. It is so distant that the light left there only about 570 million years after the Big Bang. It is on the small side as supermassive black hole go, about the mass of 9 million Suns. Analysis of the observations was able to determine the masses of both the galaxy and its black hole, the distance to the galaxy, the rate of gas consumption by the black hole, and the rate of star formation of the galaxy.

Methyl Cation – Astronomers using JWST have detected in space for the first time the carbon compound known as methyl cation, formula CH_3^+. It was found in the protoplanetary disk of a young star system known as d203-506, which is about 1350 light-years from us within the Orion Nebula. The compound is known to participate in the formation of more complex carbon-based molecules and is therefore considered an important discovery. JWST found methyl cation by means of its infrared spectral lines. The star in the system is a small dim red dwarf, which is battered by ultraviolet light from nearby hot stars. It appears that this ultraviolet is aiding in the production of methyl cation. No signs of water were found in this protoplanetary disk.

Dust Source – It has long been an issue to explain what processes created all the dust in the Universe. JWST observations of two supernovas from recent years are helping to answer this. Both occurred within the last 19 years in galaxy NGC 6946, located 22 million light-years away. The observations were made in an infrared wavelength sensitive to detecting dust and found a lot of it in the remnants of the supernovas. Firm detection of dust in the aftermath of a supernova has only occurred once before, and that was made with radiotelescope observations of the remnant of the supernova seen in 1987 in the Magellanic Cloud, a nearby galaxy. The great sensitivity of JWST to certain infrared wavelengths allowed the new dust observations. Dust can also be created by intermediate mass stars, but that does not appear to create enough dust fast enough to match observations of dust and the planets that form from it. There had been theoretical work suggesting that supernovas would destroy their own dust with shock waves, but the new observations contradict this.

Saturn Images – The first images of Saturn taken by JWST have been released. Because they were taken in a shade of infrared light that is absorbed by the methane in that planet's atmosphere, the new images show the body of Saturn much darker than its rings (which do not contain methane). Several of Saturn's moons also show up in the new images. Even though 146 Saturnian moons have been found by other telescopes, astronomers believe even more smaller dimmer moons could be found in longer exposures by JWST.



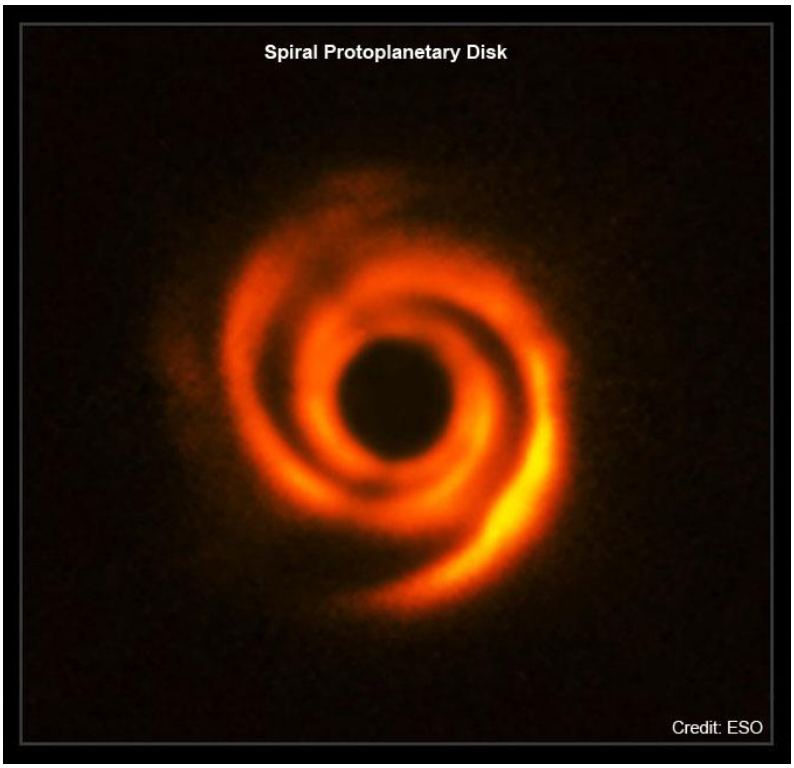
Credits: NASA, ESA, CSA, STScI, M.Tiscareno(SETI Institute), M.Hedman(University of Idaho), M.El Moutamid(Cornell University), M.Showalter(SETI Institute), L.Fletcher(University of Leicester), H.Hammel(AURA); image processing by J.DePasquale(STScI)

Very Distant Star Formation – Astronomers using the ALMA radiotelescope array in Chile have observed star-forming regions and possibly star-death regions in a galaxy so distant its light took 13.2 billion years to reach us. These are the most distant such regions that have been observed, and therefore such regions are seen as they were earliest in the history of the Universe. The galaxy was dubbed MACS0416_Y1 and is in the constellation Eridanus. Also seen in the galaxy is a large cavity about 1000 light-years across, possibly caused by successive supernova explosions.

Galaxy Without Dark Matter – A team of scientists has found the first known large galaxy with little or no dark matter. Only a very few galaxies are known to be without dark matter, and they are all tiny galaxies. A study of motions of the parts of galaxy NGC 1277 showed what the distribution of mass is, and it was found to closely match that of the stars, leaving essentially no gravitational force to be attributed to dark matter. If this lack of dark matter is confirmed, it will cast doubt on any alternate theories of gravity that do not include dark matter, because such theories cannot simultaneously explain NGC 1277 and similar galaxies that appear to have dark matter. It is believed from computer simulations of galaxy formation that a galaxy cannot form without the gravity of dark matter, so now theorists are trying to figure out how NGC 1277 could have been separated from its dark matter after it formed. More observations are planned using the William Herschel Telescope in the Canary Islands.

Cool Brown Dwarf – Astronomers measured the temperature of a brown dwarf star known as T8 Dwarf WISE J062309.94-045624.6 and found that it is the coolest star that is detectable in radio waves. There are a just a few brown dwarf stars cooler, but they apparently do not have magnetic fields that emit radio. Brown dwarfs are stars so small in mass that they cannot sustain the nuclear fusion that powers normal stars. The temperature was found to be just under 800°F. It is about 37 light-years away. It is actually a little smaller in diameter than the planet Jupiter, though it is several times more massive. Fewer than 10% of brown dwarfs emit radio, and more study is needed to find out how those few work.

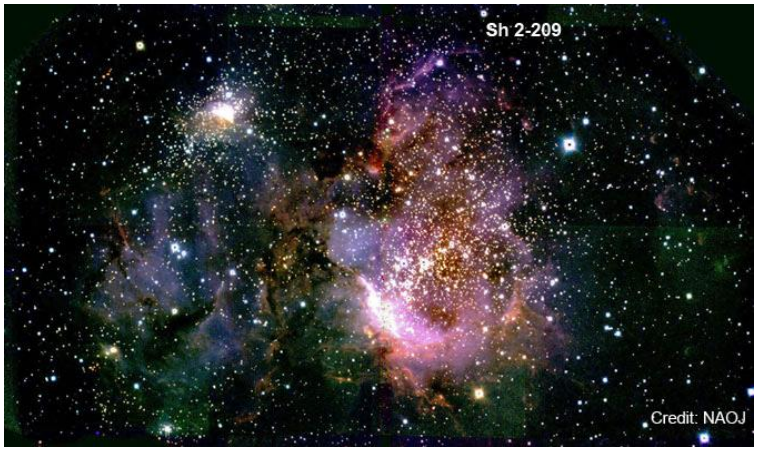
Spiral Protoplanetary Disk Explained – Spiral arms are well known in galaxies, but they also form in about 1/3 of protoplanetary disks around young stars. A new discovery may explain how these lesser-known spiral arms form. One theory of protoplanetary spiral arms is that a forming Jupiter-size planet could gravitationally disturb a disk into spiral arms. But such a forming planet in a spiral-armed disk had not been imaged until now. The newly imaged protoplanet, dubbed MWC 758c, is about twice Jupiter's mass, and is about 500 light-years away. It orbits its star at more than 3 times the distance that Neptune orbits our Sun. It was detected in infrared using the Large Binocular Telescope Interferometer in Arizona. The discoverers plan to follow up with JWST observations. The spiral in the protoplanetary disk was previously observed.



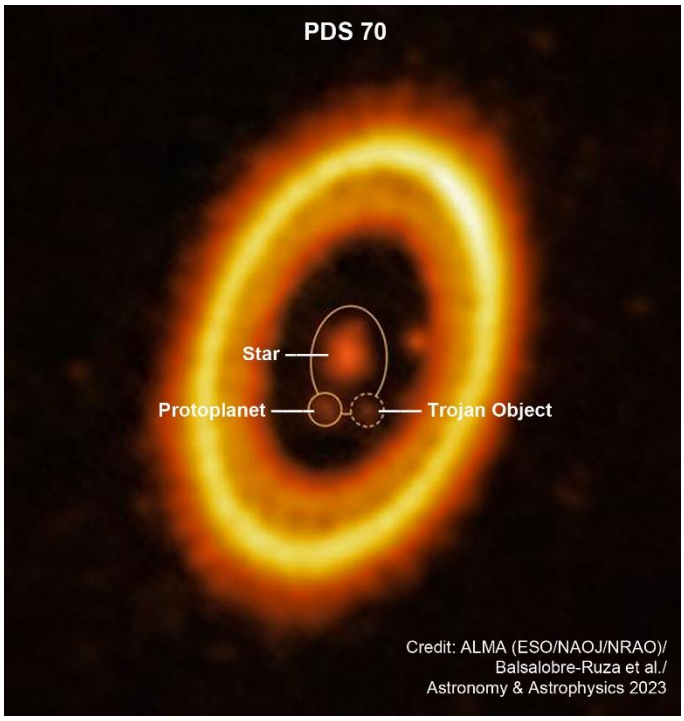
Unusual White Dwarf – A white dwarf star is the remnant left when a roughly Sun-mass star finishes nuclear fusing all the fuel it can. All that mass is packed into a roughly Earth-size star, creating extreme gravity. Then the heavier elements sink, leaving either a surface of hydrogen or of helium. Astronomers have found an unusual white dwarf that has one side with a hydrogen surface and the other side helium. It rotates about every 15 minutes. Spectra were taken of both sides to show the divided surface composition. The helium side is brighter. The star does not have a binary star companion, so that is not the cause of the division. The best theories to explain it involve asymmetric magnetic fields. But more work is needed to pin down the cause. This star may be in transition between a hydrogen surface white dwarf and a helium surface one. It will be carefully watched to see if this is the case.

Pulsing Object – Observations made with the Murchison Widefield radiotelescope array in Australia found a pulsing object that pulses too slowly to be an ordinary radio pulsar. The pulses arrive every 22 minutes. Searches of archived radio data show it has been pulsing thusly since at least as far back as 1988. Magnetars, which are extremely magnetic pulsars, have been known to pulse slowly, but none has ever persisted with slow pulses for decades like this. Also, slow magnetars are bright in X-rays, but the newly discovered object is not. It has also been suggested this is a slowly spinning white dwarf, but it has a much stronger radio signal than any known slow white dwarfs. More observations, particularly in wavelengths other than radio, are required to try to determine what kind of object this is. It has been designated GPM J1839-10 and has been determined to lie 18,500 light-years away in the constellation Scutum.

IMF – The Initial Mass Function (IMF) is defined as the distribution of how many stars of each mass result when a star cluster forms. But the IMF appears to differ according to how much of the material is just hydrogen and helium, or how much consists of heavier elements than those two. So, the IMF is going to change as the Universe collects more heavy elements as they are made in stars over time. A new study measured the IMF in a star-forming region having very little heavier elements, which would more resemble the conditions of the Universe in earlier times. Observations were made of a star-forming region known as Sh 2-209, which resides in the outer portions of the Milky Way, so is close enough to study, but far enough out that it has been little affected by stars producing heavier elements. 10 billion years ago much of the Universe had heavier element content similar to that of SH 2-209. The observations were made with the Subaru Telescope in Hawaii. The measured IMF was found to be only a little different than that measured in regions of high heavier element content. If the theoretical difference in IMF (that is, with a larger proportion of massive stars forming) occurred in the early history of the Universe, it must have occurred farther back than 10 billion years ago.



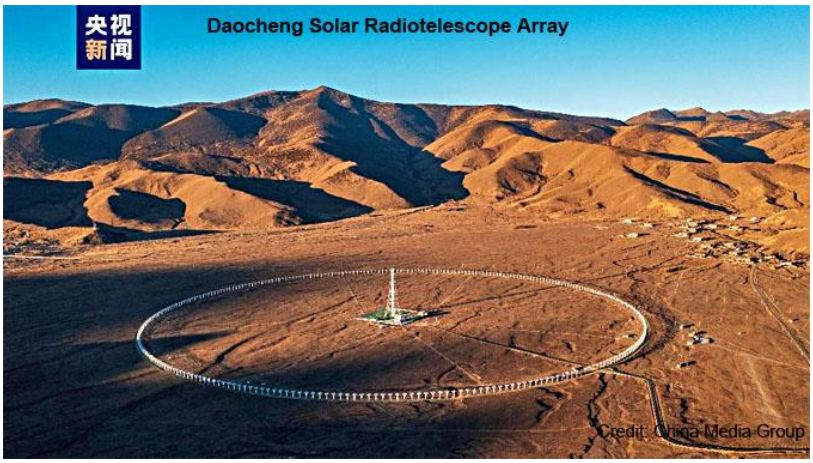
Trojan Exoplanet – Astronomers using ALMA have imaged in radio light what appears to be a Trojan exoplanet, that is, a planet sharing the same orbit with a larger planet. These are common in our Solar System; Jupiter shares its orbit with thousands of Trojan asteroids. But this is the first firm evidence of a Trojan body in an exoplanet system. The exoplanet system is known as PDS 70 and is 370 light-years away. The new image shows what is probably a protoplanet apparently sharing the orbit of a previously known exoplanet known as PDS 70b. The newly discovered object and 70b orbit about 20 times as far from their star as Earth orbits from the Sun. A disk that may form more planets is also visible about this young star system, which is only about 5 million years old. The newly discovered body was measured to contain dust with twice the mass of our Moon, but there is likely much more mass of different particle size than dust, because the radio wavelengths used in this observation are sensitive only to dust-size particles. It is not clear if the body observed has already formed a planetary body or is still debris on its way to form an exoplanet. Further observations in infrared may distinguish this.



Asteroid Boulders – Last September the DART spacecraft was smashed into asteroid Dimorphos to see how much that would deflect its orbit. That will help scientists plan a mission to deflect an asteroid from damaging Earth if and when such an asteroid is discovered in the future. The Hubble Space Telescope (HST) has been monitoring Dimorphos since then. This monitoring found 37 boulders, ranging in size from 3 to 22 feet across, that had lifted off Dimorphos, apparently at the spacecraft collision, and those boulders are drifting away at a very slow walking speed. It appears from images taken just before the DART impact that the now drifting boulders are ones that were already sitting on the surface of Dimorphos, not that the drifting boulders were broken off from the asteroid's interior. The European Space Agency is working on a spacecraft named Hera that is scheduled to reach Dimorphos in late 2026 for a close-up survey of the DART impact damage. It should learn more about the dispersing cloud of boulders.

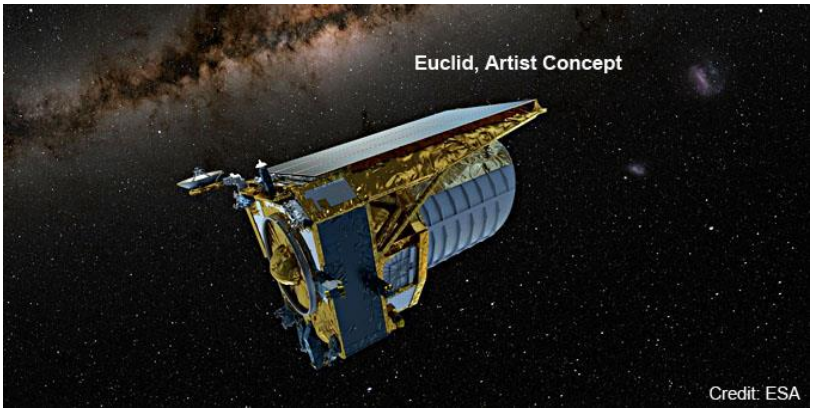
Reflective Exoplanet – Astronomers have found an exoplanet, dubbed LTT 9779 b, with the exceedingly high reflectivity of about 80%. It is a hot Neptune, that is, a gas giant about the size of Neptune, but orbiting extremely close to its star, resulting in dayside temperatures of about 3600°F. Hot Neptunes should not reflect that highly. In fact, their heat could eventually destroy their atmospheres. Spectral measurements hint that the atmosphere may be titanium sand clouds, which would explain the reflectivity. This high reflectivity may have protected the planet's atmosphere from being destroyed by heat.

New Solar Telescope – The world's largest solar radiotelescope array is beginning operations in China. It is known as the Daocheng Solar Radio Telescope. Besides observing the Sun, it will also be used to observe pulsars, fast radio bursts and asteroids.



Neutrino Map – Scientists analyzed 10 years of data from the Ice Cube neutrino detector to isolate those high energy neutrinos that appear to have originated in our Milky Way galaxy and have made for the first time a Milky Way map as seen in neutrinos. Surprisingly our galaxy seems to emit a lot fewer neutrinos than many other galaxies. It is possible that the lower neutrino numbers are related to less activity at our galaxy's central black hole as compared to many other galaxies.

Euclid Launched – The European Euclid Space Telescope was launched on a SpaceX rocket from Florida at the beginning of July. It was originally planned to launch on a Russian rocket, but for political reasons was switched to the SpaceX one. Euclid will observe from the Earth-Sun L2 Lagrange point, near JWST, about a million miles from Earth. Euclid will observe one third of the entire sky up to depths of 10 billion light-years, over a 6 year mission. It will be able to measure dark matter and dark energy distribution as they changed over the last 10 billion years. Euclid operates in visible light and near infrared. It has a very wide field of view, allowing it to cover so much of the sky.



Chandrayaan-3 – The Indian Space Agency launched its Chandrayaan-3 mission to the Moon. It is planned to put a lander and rover on the lunar surface. It will measure thermal conductivity, temperature, seismic activity and plasma density. It also has alpha particle X-ray and laser breakdown spectrometers. Its mission is specified as one lunar day, about 14 Earth days.

Response to COVID-19 Crisis

Meeting in person:	Astrophysics SIG, Anza star parties, and **monthly club meeting**
Meeting via Zoom:	**Monthly club meeting**, Beginner's Astronomy class
Coming soon:	Orange County Star Parties
Cancelled until further notice:	AstroImaging SIG
Check with Coordinator:	Outreach events

Help Wanted (Volunteering Opportunities)

- OC Astronomers Club Representative to WAA (Western Amateur Astronomers)
- Communications Coordinator doing social media presence and announcements to members

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.

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 Michael Newman mnewman2112@gmail.com

- Pad lease for LP-12 in Lower Pads section and the pier upon it $ 1000

It includes a pier that is very nicely aligned and can support a C-8 up to a C-14 I believe although the new owner may need to drill new holes. For questions and to express your interest in the pad, please contact me via email.

For Sale contact Bill Prats b.bill.p@gmail.com

- QHYCCD PoleMaster Camera Adapter for Losmandy GM811xx Mount, IEQ30/IEQ45 # 020038 $ 30
  3 Pieces, Bright red finish, no scratches
- Spotter Scope: Orion 6X30mm Correct Image Right Angle $ 30 obo
- ZWO OAG, Off Access Guider, new never used, full kit $ 100
- 12VDC to 17VDC 3 amp Voltage booster with digital voltmeter used on a Losmandy G811GM $ 50
- Losmandy Servo motor/Gemini 2 cables (pair) recent & hardly used Make offer
- Losmandy Gemini 2 Hand Controller, recent & hardly used Make offer

Contact Bill Prats b.bill.p@gmail.com Shipping is extra. All items can be picked up in Huntington Beach.

For Sale contact Eric Mjolsness emj@uci.edu

- Mars Hill Pad # MH-05 OCA license is up for sale. Includes solid equatorial pier. $ 2300 obo
  Price in 2010 was $2300. I am seeking that amount back or best offer.

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 $ 852 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 Steve Silverman Stardrek@gmail.com 949-735-8663

- Celestron Skymaster 25 x 100 binoculars $ 400
  The binoculars are in very good condition and come with a case.

For Sale contact Ami Dvir amiaddvir@gmail.com 949-294-1073

- Eyepiece Celestron X-CEL : 12mm,9mm,7mm, with boxes and all $ 170
- Eyepiece Meade 5000 PWA 28mm [like new in the box], list price is $330 $ 220
- Eyepiece Meade 5000 PWA 16mm [like new in the box], list price is $190 $ 120

For Sale contact David W. Pearson p.davidw@yahoo.com

- Star Splitter 20 inch Dobsonian telescope with servo-cat go-to capability $ 8000 obo
  Includes 8 eyepieces, laser collimator, telerad, plus more.
  If the equivalent was bought today from Obsession, it would be $15385+shipping without extra accessories
- Intes MK66 6" f/12 Maksutov-Cassegrain OTA includes rings/dovetail, case, finderscope, and diagonal $ 800 obo

These items are local pickup only. If interested, please send me email requesting a complete description.

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 Flicker here: https://www.flickr.com/photos/123906448@N08/albums/72177720309596327/.
The dome and components must be picked up in Costa Mesa.

Another Look

Dave Phelps August 2023

August's Full Moon is on the first and is traditionally called the Sturgeon Moon. Other names include the Green Corn Moon, Barley Moon, Fruit Moon, and Grain Moon. This year, it is also a Super moon. Other Native American names include the Black Cherries Moon, Flying Up Moon, Mountain Shadows Moon and Ricing Moon.

Two weeks later, on August 16 is the New Moon, a Micro Moon. There is a grazing occultation of Antares on August 24.
On August 31 is the second Full Moon of August, making it a Blue Moon. As with the previous Full Moon, it is also a Super moon. In French - Pleine Lune D'août, In German - Vollmond im August and in Spanish – Luna Llena de Agosto.

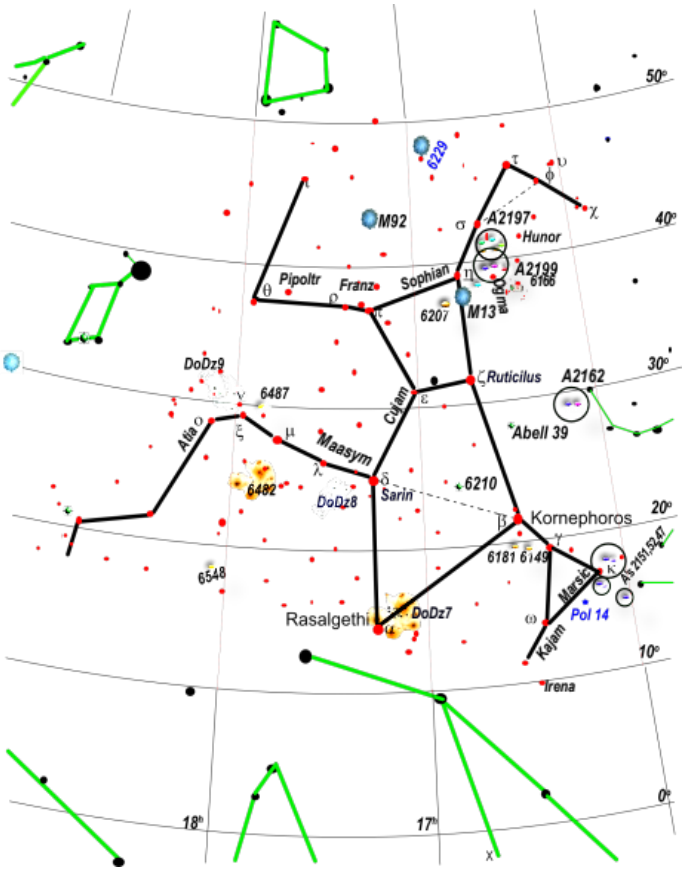
For years, I would go up to the Grandview campground in the White Mountains outside Bristlecone Pines Forest for the Perseid's. This year they peak on August 12-13, close to the new moon and on a weekend. Find someplace dark, they're a can't miss.

Hercules-the Kneeling One, also the Phantom, while Aratus wrote of an earlier time where:

> ...like toiling man, revolves
> A form. Of it can no one clearly speak,
> Nor to what toil he is attached but, simply,
> Kneeler they call him. Labouring on his knees,
> Like one who sinks he seems
> And his right foot
> is planted on the twisting Serpent's head.
> Aratus "Phainomena"

> Near to the Dragon's head, in toil-spent posture,
> Revolves a phantom, whose name none can tell,
> Nor what he labours at, they call him simply
> The Man upon his knees, his knees seem bent
> In desperate struggle, while from his shoulders
> His hands are high uplifted and outspread
> As far as he can stretch, his right foot's sole
> Is planted on the crest of the coiled Dragon.
> (Aratus)

Known only as the Kneeling Man to the ancient Greeks, his name was Engonasi. He was depicted as worn and exhausted from his battles and his tasks. Aratus also said "no one knows his name or what he labors at".



Complicating everything and telescoping history, our images show Hercules holding a branch of the Golden Apples of the Hesperides (Oranges?) with Cerberus entwined in its branches.

Centuries before, along the Euphrates, Hercules and Draco were known as Izhdubar, the sun god and Tiamat the dragon. This image certainly led to the Greek's Hercules and the Lernaean Hydra. These same Euphatians saw Izhdubar as he moved through the twelve zodiacal constellations over the course of the year, perhaps the first inkling of his twelve labors, later adopted by the Greeks.

The Phoenicians in the same way, who were influenced by ideas of religion and what we would probably think of as astrology, attributed divinity to the sun, moon, and stars, and regarded them as the sole causes of the production and destruction of all things. The sun, under the name of Hercules, was their highest divinity. For those of you familiar with your ancient poetry, Izhdubar may be more familiarly translated to either Nimrod or Gilgamesh.

Consistent throughout the centuries, this Kneeling Man asterism has had its stars borrowed by the Arabs for their flocks and the pasture where they dwelt and by the Chinese for a marketplace and a seat for their Emperor.

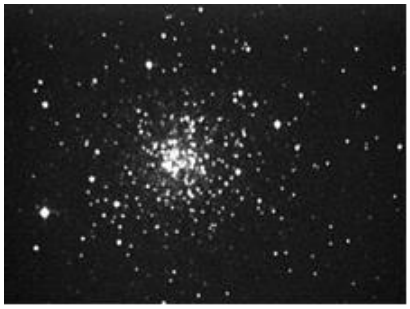
We can thank Hevelius for Cerberus and Ramus Pomifer, two obsolete constellations held in Hercules' right hand by Senex and in his left hand in the more familiar Bayer,

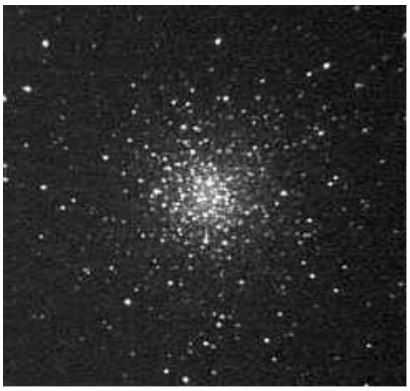
Stars to look for include alpha α, Rasalgethi, an orangish blue double. Beta β, Komephoros, is 2nd magnitude and called pale yellow or even golden red. Kappa κ has been pointed out by Webb and in the Bedford Catalogue as tawny and garnet, with a combined magnitude of about 5. There is a third companion for your bigger telescopes. I think Delta δ is worth looking at also. It is an obvious double described by Smyth as greenish white and grape red. It is also a possible five star system.

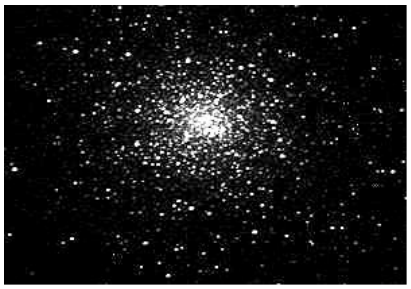
In addition to a number of Gliese systems in Hercules, systems that are multiple and quite close, Hercules has at this time 15 planetary systems. Some are named: Franz- Hat-P-14, Hunor- Hat-P-2, Irena- Wasp-38, ω Herculis- Cujam- HR 6117, β herculis- Kornephoros- HR 6148, λ herculis-Maasym-HR 6526, κ herculis- Marsic- HR 6008, α1 herculis- Rasalgethi- HR 6406, δ herculis- Sarin- HR 6410 and Ogma HD 149026.

Paraphrasing Scott Houston, Winter brings us scores of open clusters, Autumn planetaries and spring galaxies, but Summer is globular cluster time. Using just your eyes, binoculars or your short focus Dob, you can see from north to south M92, M13 in Hercules; M12, M10, and M107 in Ophiuchus; M80 and M4 in Scorpius.

Then it is easy to find M5 in Serpens and M14, M19 and M62 in Ophiuchus. There is 9th magnitude NGC 6229 at Hercules' foot and 11th magnitude NGC 6426 in Ophiuchus. There are at least a half dozen more, brighter than 10th magnitude and more for your telescope. Lastly, we do not want to forget our awesome Palomar Globular's. Pal 14 at 15th magnitude and Pal 15 at 14th magnitude.







M107 M12 M92

https://ocastronomers.org/wp-content/ uploads/2019/01/m107.jpg
https://ocastronomers.org/wp-content/ uploads/2019/01/m012.jpg
M107, M12 and M92, John Sanford OCA

Having sated our appetite for Globular Clusters, now let's stretch our know-how and look for some Open Clusters. This was the first time I came across a Dolidze-Dzimselejsvili open cluster, though I did find references to two Dolidze clusters. One in Ophiuchus and one in Cygnus. We'll look for Dolidze 9 in Cygnus in a few months.

Madona V. Dolidze was a Russian astronomer from the Republic of Georgia who compiled a catalog of open clusters. He was later joined by G.N. Dzimselejsvili and together compiled the catalog of eleven open clusters bespoken to their name.

Hercules has five DoDz clusters, most with less than a dozen stars and all with magnitudes between 8 and 10 or 11. Also, most are close to a half degree in size. Near Nu ν is DoDz9. DoDz7 is near Rasalgethi, alpha α and is very sparse. DoDz8 is near Sarin delta δ, is also very sparse, but listed at 14" and 8th magnitude. Those specs should make it easier to identify. The last two DoDz's in Hercules are up at the top right of the keystone, between M13 and eta η herculis. DoDz5 and 6 are also sparse, less than a dozen stars but easily visible at 9th+ magnitude.

The DoDz Catalog compiled by Paul Markov back in 2001, is a little different from the AstroLeague's, if you would like to compare.

https://astrobuysell.com/paul/DoDzClusters.htm
https://cfas.org/data/uploads/astronomy-ebooks/openclusters_manual.pdf.

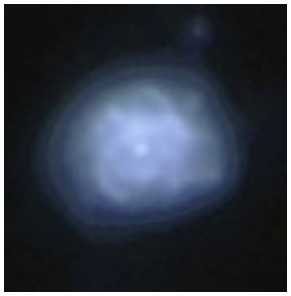
DoDz7 DoDz8 DoDz5

All the DoDz images can be found on flckr by Dan Crowson. One of the fellows at Cloudynights, Jef De Wit, did drawings which you can find at: **https://www.cloudynights.com/topic/483527-all-the-dolidze-dzimselejsvili-clusters/** . One final note about DoDz's is there is some doubt that all of the members of each cluster are actually gravitationally bound together. Sigh!

One source has sixty-six deep sky objects 13th magnitude and brighter that we can find in Hercules. It also has an additional thirteen in the 14th magnitude range. Burnham lists over one hundred and fifty double and multiple stars, nearly one hundred variable stars, three planetary nebula, 3 globular clusters and seven galaxies. There are seven Abell galaxy clusters associated with Hercules, and the Hercules-Corona Great Wall, five within the constellation boundaries. Any way we choose to look, Hercules is a constellation that could easily take years to explore and study in detail.

We looked at Globular and Open Clusters and now we will look at a few Planetary Nebula. Abell 39 is over by Corona. It's almost 13th magnitude, maybe a little fainter, with a 15th magnitude white dwarf central star. It is the only Abell planetary in Hercules, so I thought it was worth a mention. It's big, 3 min x 3 min and should be visible with an OIII filter.

NGC 6210 is a bright 9th magnitude planetary of 5 min x 5 min on a line between beta β and δ delta.



NGC6210

Abell 39 Peter Goodhew, Flickr

Carsten Dosche **https://www.astrobin.com/186371/?q=ngc 6210**

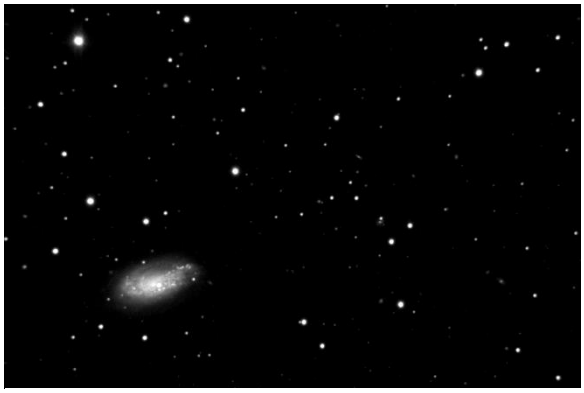
NGC 4593 is also bright at 10th magnitude and 3 min x 3 min. NGC 6058 is over by Abell 2197, its a 4 min x 4 min and 13th magnitude.

The last planetary is Hu 2-1, a smallish 13th magnitude planetary over by 110 Her, right in the middle of the apple tree. Hu is named for Milt Humason, a mule skinner who carried supplies up to the Mt. Wilson site when it was being built and then stuck around and became an assistant. He had to have been quite a guy, someone with whom I would have liked to have had a cup of coffee.

Hercules has six galaxies in the 11th magnitude range that are worth searching for. None of them are too big, in the 2-to-3-minute range. Amateur images are few. These are the NGC's:

6166	elliptical	6181	spiral barred
6207	spiral	6482	elliptical
6487	elliptical	6548	spiral barred

http://www.kopernik.org/images/archive/n6548.htm



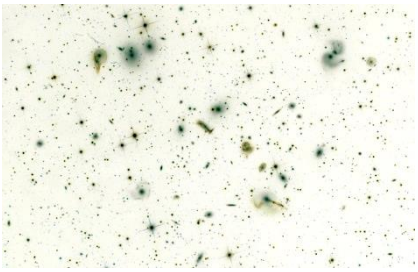
http://www.astrosurf.com/mcianci/ngc6207.html

There are five Abell galaxy clusters of note in Hercules, down his flank from his knee to his club. Abell's 2197 and 2199 are a pair, a favorite target for astrophographers, anchored by N6160 and N6163, 11th magnitude, the area contains several hundred galaxies many of which will be visible in your 12" telescope.

Abell 2151 is the Hercules super cluster. A2151 has several hundred galaxies, all faint. Probably deep sky images are the best bet. A2151 is anchored by 14th magnitude NGC 6041. Just below these are A2152 and A2147.

Within the area of a couple of full moons are hundreds of galaxies, all faint. There will be thousands once Webb gets a bead on them.

Dark Skys



Abell 2151

http://www.astronet.ru/db/msg

From the Editor

Due dates for submission of articles, pictures and advertisements

Issue	**Due date**
September	19 August
October	23 September
November	21 October

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