



Omega Centauri NGC5139 imaged by Rick Hull at Portal, AZ in May 2018 using 90mm refractor with SBIG STF8300C camera

Because of the COVID-19 crisis and ongoing efforts to reduce exposure to the virus:

- **All in-person club events are cancelled**
- **Use of the Anza site is discouraged**

Please read more about how OC Astronomers has modified its activities on page 2.

Upcoming Events - free and open to the public

Beginner's class	Friday, 2 April at 7:30 to 9:30 PM The topic this month will be the different types of equipment used to observe the night sky, including telescopes, mounts, eyepieces, filters, and advantages and disadvantages of different options.	ONLINE
Club Meeting	Friday, 9 April at 7:30 to 9:30 PM "What's Up?": John Garrett from Temecula Valley Astronomers Main speaker will be Dr. Jaymie Matthews from University of British Columbia whose talk will be "What will astronomy be like in 2121?"	ONLINE
Open Spiral Bar	Saturday, 10 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

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

Response to COVID-19 Crisis

COVID-19 continues to affect all our activities. All in-person club events remain cancelled through at least the spring of this year. Cancellation periods for specific events are detailed below. Please see the President's Message for additional information.

Any use of the club's Anza site by members is at their own risk as we have no way of cleaning or sanitizing the site to CDC standards. If you must go to the site, be sure to clean and sanitize surfaces you have contact with and make sure it is cleaner when you leave than it was when you arrived. You must bring cleaning supplies and sanitizer with you as it is not provided at the site. Be sure to take any trash that you generate or find on the site out with you, and please maintain social distancing if anyone else is out there.

If you have any questions, feel free to contact board members or post them to the email groups or through social media. We will do our best to respond, but please bear with us if there is a delay as we all have other responsibilities as well.

We hope you and your families and friends all remain safe and healthy, and best wishes to all of you!

Summary of Cancellations of OCA In-Person Events

Due to the ongoing COVID-19 crisis, all in-person club events are cancelled through at least the following periods:

General Meetings	Cancelled until further notice; please try our virtual meetings instead
Anza Star Parties	Cancelled indefinitely
Orange County Star Party	Cancelled indefinitely, until allowed by Orange County Parks
Outreaches	Cancelled indefinitely
Beginners Astronomy Class	Cancelled indefinitely, please contact Dave Pearson to attend Zoom classes
SIG Meetings	Cancelled indefinitely, depending in part on availability of facilities and when meetings could go forward safely. Some may schedule Zoom events.

Please check the website, email groups and social media for updates.

From the Editor

Sirius wants photograph submissions from club members

If you would like your picture on the cover, please send it to me along with a brief description of the subject, where the image was taken, and the equipment used.

Ideas for Future articles

The newsletter includes articles from members or about subjects suggested by our members. We seek ideas and writers to cover them. To contribute an article or work with the editor to produce one, please contact me at newsletter@ocastronomers.org.

Due dates for submission of articles, pictures and advertisements

<u>Issue</u>	<u>Due date</u>
May	24 April
June	22 May
July	19 June
August	24 July

President's Message

By Barbara Toy

With April, spring should be well underway. In a wetter year we could expect wildflowers to enjoy during the days, sometimes as compensation for nights that are not as clear as we would like for astronomical activities. Unfortunately, even though we've had some rain in March, it's been a dry year, typical in Southern California for a La Nina year, and we don't expect many blooms. It would be some compensation if drought conditions translated to generally clear night skies, but, sadly, that often isn't the case.

Fire...

Given the general drought conditions this year, it's likely we'll have an early start to the fire season. Though we're still not having our regular star parties and still discouraging people from going out to our Anza site, if you do go out there and see brush growing near Anza House or the club observatory, please do what you can to clear it away to minimize danger to the structures should we have a fire come through the site. If you are a pad or observatory licensee, please be sure to clear the areas around your pad or observatory early in the season, even if it means that you must do some additional clearance later as well, to help keep those areas safe.

... and Critters

This is also the time of year when the local wildlife becomes more active and more of a potential problem at our Anza site. Our site is in a rural area (intentionally, as that makes for darker skies, which we need for our observing/imaging activities). Much of our site and the surrounding areas are still in their natural state with a full range of native plant and animal life. That, by the nature of things, includes some creatures that are poisonous, like black widow spiders and rattlesnakes, and some that cause other problems, like mice or rats that sometimes get into engine compartments and chew on important wires or hoses. There are also larger animals that come through on occasion – coyotes, possibly mountain lions or lynxes (though I've never seen any sign of them myself), and dogs from the neighborhood.

If you use our Anza site, it's necessarily at your own risk as we have no way to protect people from possible dangers out there, including such dangers as falling in holes left by burrowing animals or water runoff. Everything that is done for or by the club is done by volunteers, all of whom have other responsibilities and live some distance away, and we don't have resources or personnel to monitor for potential problems or take preemptive measures to protect against them as a matter of course. When we find out about significant problems we try to resolve them within reasonable periods of time, but ultimately members using the site are responsible for their own safety – that's as a general matter, not just as to Covid-19 safety measures.

Some general pointers that can help with local wildlife that I've gleaned over the years are:

- Stick to the established roads and paths when you move around the site, particularly at night;
- Make noise as you move around, and give anything that might be in or around your line of travel time to move away. Most animals are even less eager to meet up with you than you might be to meet up with them;
- Carry a red flashlight with you when you move around at night and use it to make sure the path ahead is clear, even if the night seems bright enough to see your way without the flashlight;
- When going into any enclosed area that's been closed for any length of time, check for black widow spiders and dispose of them before using the area. That would include enclosed areas in Anza House, storage sheds, and the restroom and warming room at the club observatory;
- Be aware that rattlesnakes can shelter under pieces of scrap wood or other things that are lying around at the site, and be careful when moving anything that might be a shelter;
- If you don't have the right tools and know-how to safely kill a rattlesnake if you come across one, it would be better to let it move away than run the risk of getting bitten. If there's anyone else around, let them know that there's a snake in the vicinity and where you saw it, so everyone can avoid it;
- Bites from baby rattlesnakes can be worse than bites from adults, as they can't regulate the amount of poison they give in a bite, so don't think that a small rattlesnake is less of a concern just because it's small;
- If you bring your dog with you out to Anza, keep it on a leash (for its safety and the safety of others on the site) and keep it on the paths and roadways and out of the brush as well. The one rattlesnake bite I know of at Anza was to a young dog that was exploring the area next to a path at night and found a snake the hard way – the dog survived but had to be driven a long way to get medical help;

- Check anyplace you plan to put your hands, feet, knees, etc., for inhabitants before coming in physical contact with it, just in case. This, by the way, could include shoes if you left them unprotected – I haven't seen any myself, but I'm told that there are scorpions on the site and that they can take refuge in shoes or other locations.
- As to keeping rats and mice out of engine compartments, this tends to be more of a problem for people who spend multiple nights out there, and/or who park in brushy areas where it would be easier for them to access the vehicle. Aside from parking away from any brushy areas, the most common approach I've seen for trying to avoid this kind of problem is leaving the hood open to dissipate the engine heat and, as the compartment is open, make it less attractive as a refuge. Some people do things to make it harder for rodents to climb the tires to gain access (I think one involves setting a trap on top of each tire). If you want suggestions on what people have found successful, I suggest you ask either on one of the email lists (ocastronomers@groups.io, AstroImagers@groups.io) or among regulars at Anza;
- You can often hear coyotes howling in the hills around the Anza site, but they generally stay away from the site when there are a lot of people there, such as for star parties, and it's rare to see one even when there aren't many people on site. The one time I came across one was when I was there alone, and it just looked at me in apparent surprise that I was there and went on about its business. General rules would be not to feed them and, if you have a dog (or small child) with you, make sure it isn't left in a situation where it might be considered easy prey. If you happen to run across a coyote that doesn't move on immediately, the general advice I've seen is to stand up and make yourself look as big as you can – definitely don't turn your back on it or bend down or crouch – and wave your arms, yell, use any sound maker or whistle you may have, even throw rocks or spray it with water to scare it off. Fortunately, though, if history is any guide, the chances you would need to drive off a coyote out there are minimal.
- Neighbors' dogs are far more often seen on our site than coyotes, and most of them are pretty friendly. There was one incident two or three years back where a group of dogs seemed more aggressive, and the member who reported it took refuge in the club observatory with the door closed until they left. They haven't been reported on the site for quite a while and seem to be gone, but if you happen to encounter an aggressive dog out there, please take whatever steps you need to protect yourself, and, once you are in a safe position, if you can get pictures of the dog in question, that would help determine whose it is so steps can be taken to deal with it.

As a different sort of wildlife, every so often there are reports in the news of arrests in the Anza/Aguanga area for drug-related activities. If you happen to observe any activity in the vicinity of our site that seems questionable, we strongly recommend that you don't do anything to investigate it yourself, for your own safety, but that you report your observations to the Riverside Sheriff's Department and leave it to them to figure out what's going on and whether any action should be taken regarding it.

This isn't intended to cover all of the possible problems or hazards you might run into on an observing trip to Anza, but hopefully it gives you an idea of the kinds of things to look out for. Most of us live in highly urban areas these days and may not have much awareness of challenges that a more rural area can present. With all that said, though, most of us don't really have significant wildlife experiences out at Anza most of the time, even those members who spend a lot of time out there. And, if you take reasonable precautions, observing out at Anza is generally about as safe and comfortable as viewing sites get.

Of course, this year we have the additional continuing concern of staying safe from Covid-19 and its variants. If you go out to Anza, please continue to follow safe practices as recommended by the CDC – including using masks, keeping social distancing and washing your hands frequently. Please be sure to bring sanitizer and any other cleaning agents/tools you may need to clean surfaces you touch before and after touching them. Even if you've had the disease and/or have been vaccinated, it's important to continue with these practices to minimize the spread of variants that may not be affected as much by the antibodies generated against the original virus.

May you all remain safe and healthy, and may you find a fun way to pursue astronomical activities, wherever that may be!

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AstroSpace Update

April 2021

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

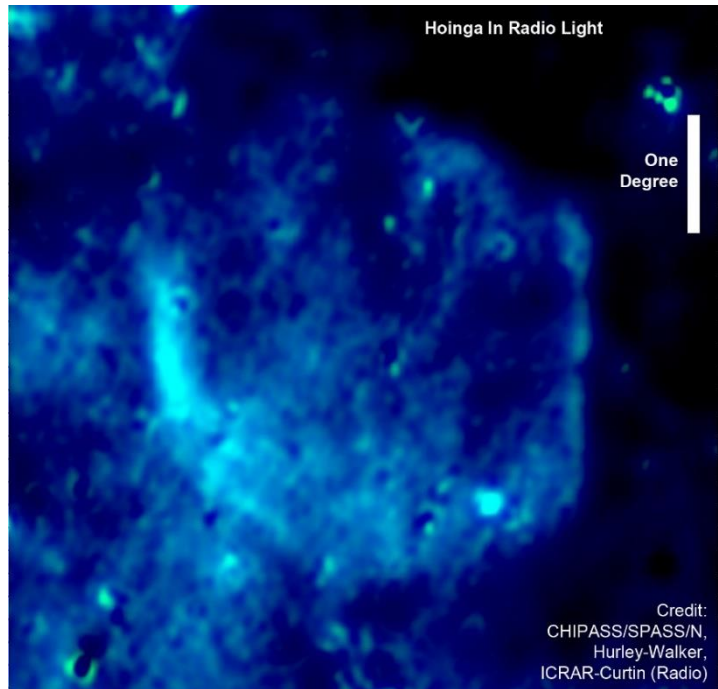
Earliest Cluster of Galaxies – When the first stars formed in the early Universe, essentially all of space was filled with neutral hydrogen gas. Much of the light from these first stars was in the ultraviolet. Unfortunately, neutral hydrogen absorbs ultraviolet. Thus observations of the first stars have been difficult. Eventually strong ultraviolet light, either from the new stars or from newly formed quasars, ionizes (knocks the electrons off) hydrogen, and ionized hydrogen transmits the ultraviolet, so that the light can reach us. Thus it has been difficult to make observations of these first stars. A new observation has found the earliest known dense cluster of just-forming galaxies, a rare sight that will help astronomers understand how these early stars and galaxies of stars formed. Spectroscopic observations determined the redshift, and therefore the distance, of the cluster, and it was found to be the most distant known dense cluster of galaxies. We see it as it was when the light left there, so being the most distant makes it the earliest seen. The find was made during a search for early galaxies known as the LAGER search. That found dozens of galaxies whose redshift showed that we are seeing them about 750 million years after the Big Bang, and the most redshifted of these is the newly announced record holder. The initial find was made using the Dark Energy Camera on the Victor Blanco 4-meter telescope in Chile.



Cygnus X-1 Is Farther – The first generally accepted discovery of a black hole is the object known as Cygnus X-1. It was first seen by a rocket-launched X-ray telescope in 1964. It is a binary pair of stars, one being a black hole, which glows in X-rays because the other star, a blue supergiant, is dumping material into the black hole. It has been difficult to get parallax measurements of Cygnus X-1 in X-rays, so astronomers' distance estimates for it have poor precision. A new measurement of parallax was carried out using the VLBA, and array of 10 radiotelescopes spread across the country. The same observations also measured the motions of and distance between the black hole and its blue companion. From this, astronomers were able to calculate properties of the pair, including distance and masses. The mass of the black hole was found to be 21 Sun's masses, about 50% larger than previous estimates. The distance was found to be about 7000 light-years, also larger than previously thought.

Galaxy Distances – A new paper has validated a different method of determining distances to galaxies. Edwin Hubble showed that M31 was a galaxy separate from the Milky Way in the 1920s by calculating its distance from the observed brightness of Cepheid variable stars. The true brightness of a Cepheid can be determined from its period of varying. The newly validated method uses stars in the J-region of the Asymptotic Giant Branch (JAGB) in a similar manner. This specific type of giant star is distinguished by a large amount of carbon in its atmosphere. They all seem to have the same true brightness. The validation was done by using the JAGB method to determine the distance to the WLM galaxy, and comparing this to other established methods of measuring such distances. The JAGB method has 2 advantages: It can be used for farther galaxies, because JAGB stars are brighter than stars used in other methods; JAGB stars occur in all types of galaxies, while Cepheid stars are found only in some types of galaxies. Because the expansion rate of the Universe (the Hubble Constant) depends directly on distance measurements, use of this JAGB method might help settle the disagreements among various methods of measuring the Hubble Constant.

Supernova Remnant Found – A huge supernova remnant has been discovered in the first all-sky survey released from the eROSITA X-ray space telescope. The remnant has been confirmed in radio data. Also it was found to be barely visible in archived 30-year-old X-ray data. It is the largest supernova remnant that was discovered in X-rays, measuring 4.4 degrees across. It is unusual in being located outside the plane of our galaxy. The discoverers are calling the remnant “Hoinga”, the medieval name of a town in Germany. Such a remnant, the material thrown out by a supernova blast, typically remains visible for about 100,000 years, then fades. The rate at which supernovas happen in our galaxy implies that there should be many more remnants than are known, so the search for remnants continues.



Trojan Comet – An asteroid, known as 2019 LD2, which was discovered a couple of years ago among the Jupiter Trojans, was found on further observation to be a comet: it has a head and tail, unlike an asteroid. The Trojans are asteroids that share Jupiter’s orbit about the Sun, but ahead or behind the planet, near one of the Lagrange gravitationally stable points. Tracing its path backwards, it appears that it was an icy body in the Kuiper Belt that by chance got too close to Jupiter and was gravitationally deflected toward one of Jupiter’s Lagrange points, and remained captured there. Tracing its path forward, it will in a few years encounter Jupiter again and likely be deflected into the inner Solar System. It is too far from the Sun, and therefore too cold, to be turning water ice into vapor, so the comet head and tail are probably carbon monoxide or carbon dioxide, which turn to vapor at much lower temperatures.

FAST Fast Radio Bursts – Fast Radio Bursts (FRBs) happen all the time, perhaps more than one per second, but are rarely observed because usually no radiotelescope happens to be pointed in the right direction at the right time. FAST, the largest radiotelescope dish on Earth, located in China, has joined the search, finding 3 FRBs. Like most FRBs, these originated in distant galaxies. The cause or causes of FRBs remain heavily debated, so more observations are needed to establish the cause.

Martian Cloud – A very long cloud has been seen near the Martian volcano Arsia Mons at certain times of day and times of year since the Viking spacecraft orbited Mars in the 1970s. A new study of this cloud has been made using data from 5 spacecraft orbiting Mars now and in the past. The VMC camera on the European Mars Express spacecraft was particularly helpful in this study because it has a very wide field of view. The VMC camera was incorporated on Express only to confirm successful separation of the Beagle 2, which shared a rocket ride to the Red Planet with Mars Express. Beagle 2 indeed separated successfully in 2003, but unfortunately was lost during attempted landing, and VMC was turned off. Years later the camera was turned back on for the purpose of taking pretty pictures of Mars for public outreach. Recently VMC was reclassified as a science camera in order to be used for such purposes as the Arsia Mons cloud study. The cloud was found to form before sunrise, stretch out as much as many hundreds of miles long, detach and drift, and then dissipate within hours. This happens only in Martian spring and summer. Such clouds form when wind is deflected upward over mountains and cooled, both on Earth and Mars. However, this is the longest and most dynamic such cloud.

Martian Water Lost – Ample evidence shows that liquid water flowed on Mars billions of years ago, apparently forming lakes and seas, but the planet is now a freezing cold desert. Previous work has shown that the planet's atmosphere and water were largely lost to space and that some of the ancient water remains as ice underground and in the polar caps. But these works had trouble matching the measured ratio of hydrogen and deuterium (heavy isotope of hydrogen) found on Mars now. A new computer simulation that included more ways in which water could be lost found that most likely more Martian water was lost by chemically bonding with rocks to become minerals than was lost to space or other means. The simulation showed that between 30 and 99 percent of the water lost is now locked up in minerals, that range depending on some unknowns, such as the rate of water loss to space in the past (present water loss to space has been well measured). The new simulation appears to better match the hydrogen/deuterium ratio observed. Minerals that lock up water include clays, hydrated salts and others.

Solar Particle Source – A coronal mass ejection, or CME, occurs when the Sun throws out hazardous charged particles at high speed. Exactly where the particles come from and how they are accelerated are matters of debate. A new observation shows that the particles collect in the lower parts of the Sun's corona, trapped by powerful magnetic fields until they are released. Data from the Wind and Hinode spacecraft were used. They showed that the abundances of silicon and sulfur in CMEs matched that of plasma (hot charged gas) trapped lower in the corona by magnetic fields.

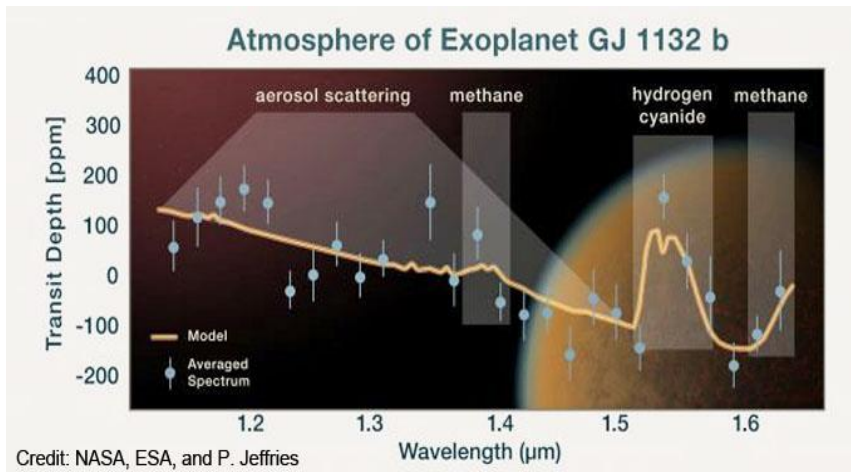
Cosmic Web – Astronomers have long believed that there exists a cosmic web of gas flows connecting the galaxies of the Universe. Observations in recent years have imaged a few portions of this web that happened to be illuminated by quasars. A new observation, using the Very Large Telescope in Chile, has imaged a section of this web that is illuminated by starlight that is much weaker than quasar light. The galaxies producing the starlight were not individually visible in the observation.

Taking a Star's Temperature – A red supergiant star dies when it runs out of fuel and experiences a Type II supernova explosion. Astronomers would like to understand the details of this. But the temperatures of red supergiants have been difficult to measure because they have complex upper atmospheres, so measurements of the layers get mixed up. A new study has found that the ratio of the strengths of 2 different spectral lines of iron can be used to determine red supergiant temperatures. The newly derived temperatures matched well with calculations of overall brightness, which depends on temperature.

Binary Star Catalog – An astronomer wrote a computer program to search the data from the Gaia space telescope to find binary stars that orbit each other. It checks that both stars of any apparent pair are at the same distance and are moving through space together. A search was made but limited to stars within about 3000 light-years of us, because distance measurements tend toward poorer accuracy beyond this. The result is a catalog of 1.3 million binary pairs. The largest previous binary catalog has only about 200 entries. There are probably many more binaries within that distance because many binaries would be so close that Gaia would see both as a single image. It is thought that at least half of all Sun-like stars are in binary pairs. A finding in the new catalog is that the stars in any given pair are more likely to be of similar mass than would be true if they formed with random masses. Some previous studies have indicated this. Among the binaries found, about 17,000 of them include 1 or 2 white dwarf stars. This is important because the ages of white dwarf stars can be determined more accurately than most other stars. Both stars of a binary pair almost always have the same age. So this new catalog will also serve as a source list of 17,000 pairs of stars with known ages.

Exoplanet Atmosphere Replaced –

In 2015 astronomers discovered an exoplanet orbiting a red dwarf star known as Gliese 1132, 41 light-years away in the constellation Vela. It orbits so closely to its star that its year is only 1.6 Earth days. The proximity to the star's heat and stellar wind should have blown away the planet's atmosphere. So it was a surprise when recent observations with the Hubble Space Telescope showed the planet has an atmosphere. A spectrum of the



atmosphere was obtained and it contains hydrogen, methane, hydrogen cyanide and something akin to smog. These can be expected to be found in volcanic emanations. Quite likely volcanic activity is replacing the atmosphere lost previously. Because the star's proximity continues to erode any atmosphere, the volcanic activity would have to be continuously replacing it.

SLS Tested – SLS, the rocket destined to take humans to the Moon in NASA's Artemis program, has passed a major test of its core stage. This stage was strapped to the ground and fired for more than 8 minutes, the time that it will fire to launch to the Moon. The previous attempt at this test, made in January, shut down after only about a minute. This tested stage will be used for the Artemis 1 mission, a flight to the Moon without crew.



Antineutrino Resonance Observed – In 1960 Nobel-Prize-winning physicist Sheldon Glashow predicted that an antineutrino with just the right energy would interact with an electron to produce a particle later named the W^- boson in a process that became known as Glashow resonance. The W^- particle was discovered in 1983, but the resonance process occurred at too high an energy to be produced in any particle accelerator ever made. The IceCube neutrino detector has now caught an instance of this resonance involving an antineutrino that was raised to such high energy by nature. The "just right energy" was found to be 6.3 petaelectronvolts (peta means quadrillion). The search for more instances of this will continue, though such high energy in a neutrino or antineutrino is extremely rare. This is only the third particle with roughly this high energy seen by IceCube in a decade of operation.

We Made It Ourselves

This column features astronomy related things made club members or with the help of friends. Submissions for the column should be sent to the editor (newsletter@ocastronomers.org).

Here are the things submitted thus far:

Adapters:

Extension tube with T adaptor thread for Canon DSLR; Plastic spacers for M42 and M48 tube assemblies; Scope ring adapters for a refractor.

Mount related:

Finder bracket and rings for refractor; Barn door tracker based on stepper motor; Worm and rack gear for equatorial mount; Counterweight made with lathe; Dovetail bars modified to route cabling; Riser blocks for telescope and guide camera; Side trays and bucket for holding gear on piers; Small counterweights to balance optical train in third dimension; Various schemes for DSLR and guider attachment to dovetail bars.

Optics:

10-inch Dobsonian scope; 80-mm refractor made from broken 80-mm binoculars; Optical tester (patented) for convex, concave, flat, and Schmidt Corrector surfaces without preparing a master surface first; Red-circle finder (similar to Telrad); Solar filters for binoculars.

Software, spreadsheets:

Imaging Planning Database Tool; Automated Observatory Script; Excel macro to calculate Maximum Image Capture time for Planets without Blur; Software to automate image transfer off CF/SD cards and prep for processing including automation with Siril stacking; Telescope performance comparison spreadsheet; Telescope protection scheme against pier collision; Celestial catalog filtering spreadsheet to generate monthly imaging candidates

Structures and supports:

Pier extension; Pier top plates (2 types); Tripod shelves to keep gear off the ground; Tripod spreader milled from aluminum; Wedges to convert fork-mount scopes from alt-az to equatorial; Warming room at the OCA observing site; Wind screen for pad at Anza.

And more good stuff:

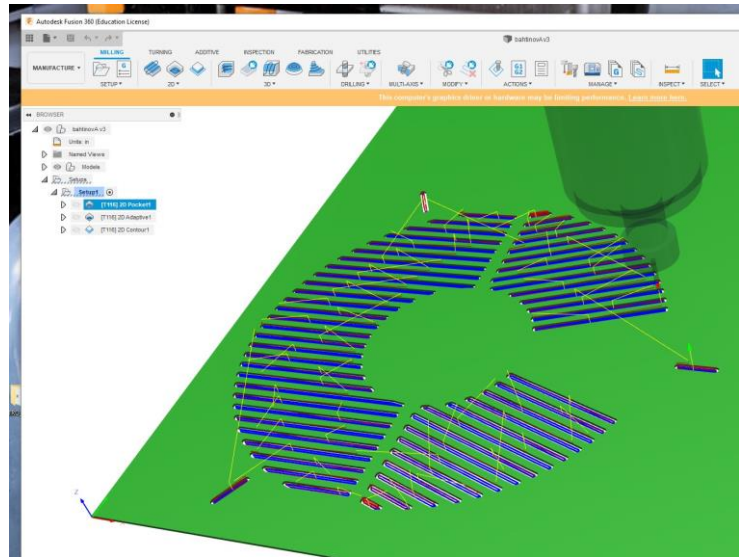
Focusing masks Bahtinov and Hartmann; Diffuser plates for taking sky flats, Flat field light boxes; Battery powered red fluorescent lamps; Dew shield for telescope and Dew tents for laptops; Laptop glare shield for daytime use (solar observing); Telescope cases made from tool boxes; Power distribution panel.

Bahtinov Mask for 12 inch SCT

Made by: Chris Porter

Written By: David Pham

OCA member Chris Porter created the Bahtinov mask pictured below in its nearly completed state using a 3-axis CNC mill at his home workshop about three months ago. He designed the mask with the intention of using it to help focus his 12" Meade SCT. Though Bahtinov masks are relatively inexpensive to purchase (ranging from \$20 to \$40), Chris wanted to experiment with an online Bahtinov mask generation tool that features pre-made templates in the form of SVG files which can be easily imported into CAD/CAM software as shown in this screenshot.



The work process involves using Fusion360 or alternative CAD software and is relatively straightforward. Chris was able to easily complete the project within one day. He began with an access to an online mask generation tool and inputted the required parameters for his telescope on the website (e.g. focal length, inner diameter, and outer diameter). He then downloaded the SVG file generated by the online tool and imported to Fusion360. The imported file generates a 2D image of the mask and requires the user to manually project into a 3D model.

Once scaling is complete, a CAM toolpath is created to run the 3-axis CNC mill. For this project, Chris used 1/16" ABS black plastic which was \$14 for a 24" x 36" sheet on Ebay. The ABS sheet is fixed to the mill's bed and the control program is run to cut out the mask. It is important to default the mill's coordinates to (0, 0, 0) before letting it run. The finished result is shown below.



Chris says that the mask he created has been working as intended and gives nice sharp diffraction spikes and a clearly defined center when focusing. For those who want to replicate this project, he also notes that a CNC mill is not mandatory and masks for smaller aperture telescopes can be made using a 3D printer which requires the extra step of importing the model into a splicing program to create a path for the printer extruder.

Easy Riser Block

Made by: David Fischer

This was made for the AstroTech AT80EDT refractor to raise its focuser above the dovetail bar so that it could be placed towards the end for better balancing.

Why make instead of buy ?

I wanted a riser quickly and already had scrap aluminum of suitable dimensions. Commercially available risers didn't provide the cable routing or third axis balancing capability.

Tools used:

Electric hand-drill, hacksaw and threading tap set.

I trusted the flatness of a scrap piece of extruded aluminum bar and drilled 1/4 inch through-holes to match up with the telescope rings spaced out the way the telescope is mounted. Extra mounting holes were drilled for one of my other telescopes.

A 1/4-20 threaded hole was included across the riser bar for a hook to guide cables. This hole is threaded on both ends to permit the routing hook to be placed on either side. It can also be used for insertion of a small counterweight for third-axis balancing when needed.

The riser worked as planned as has been in use ever since.



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	David Hobbs	david_hobbs714@yahoo.com	
•		20" F5 Research grade early Coulter mirror and secondary mirror		\$2800
•		Primary mirror is 2 3/4" thick, Secondary is 4" x 5 5/8"		

For Sale	contact	Ron Choi	rongrace2@cox.net	
•		Orion StarShoot AutoGuider	reduced price	\$ 220
•		Orion Mini 50mm Guide Scope	reduced price	\$ 50

For Sale	contact	David Fischer	Leyes-Fischer@cox.net	
•		Orion ST-80 refractor model 09948 - f/5 achromat, used for a while as guide scope		\$ 70
•		Just the telescope – no rings, no diagonal, no eye-pieces, no case		

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Dark Sky SIG
Youth SIG

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