The Objective View

August - September 2011

Newsletter of the Northern Colorado Astronomical Society

Robert Grover, President
pres@
Tom Teters, Vice President 970 482 5702
vp@
Dave Chamness, Secretary and AL Correspondent
sec@ 970 482 1794
Dave Auter, Treasurer 970 204 6919
treas@
Greg Halac, Web Editor and Outreach Coordinator
web-edit@ 970 223 7210
Dan Laszlo, Newsletter Editor office 970 498 9226
objview@
append ncastro.org to complete email address

Next Meeting: September 1 7:30 pm

The Atacama Desert: Earth's Exoplanet

by Robert Michael

Club Business at 7:15 pm

Fort Collins Museum, 200 Matthews St
Fort Collins CO

http://nightsky.jpl.nasa.gov/club-view-directions.cfm?Adress_ID=2810

NCAS Programs

Oct 6 Mike Hotka Constructing a Dobsonian Telescope

City of Fort Collins Natural Area Program at Sunset

Fossil Cr Reservoir Sep 17
Bobcat Ridge Sep 22

http://www.fcgov.com/naturalareas/finder/bobcat
http://www.fcgov.com/naturalareas/finder/fcopenspace

Larimer County Park Skygazing

Carter Lake Aug 6
Flatiron Reservoir Sep 3

http://www.larimer.org/naturalresources/parkareas.htm

Rocky Mountain National Park Skygazing

Upper Beaver Meadows Trailhead at dusk.
Aug 5, 19

Dark Site Observing Dates

Sept 2, 3, 4: Keota or other site, ask FRAC newsgroup

Other Events

Chamberlin Observatory Open House, 7 to 10 pm
Aug 6, Oct 1, Nov 5, Dec 3
303 871 5172 http://www.du.edu/~rstencel/Chamberlin/

Cheyenne Astronomical Society 7 pm Sep 16 Why is the Sky Dark? Robert Roten. Cheyenne Botanic Gardens.
http://home.bresnan.net/~curranm/

CSU Madison Macdonald Observatory Public Nights
On East Drive, north of Pitkin Street
Tuesdays after dusk if clear, when class is in session

Estes Park Memorial Observatory. 8:30 pm Sep 17;
7 pm Sep 22 http://www.angelsabove.org/

Little Thompson Observatory, Berthoud 7 pm Sep 16
Theory of Everything by John Ensworth
http://www.starkids.org

Longmont Astronomical Society 7 pm Sep 15 TBA
IHOP 2040 Ken Pratt Blvd http://www.longmontastro.org/

July 7 Program: Epsilon Aurigae: Exiting Eclipse by Dr. Robert Stencel, University of Denver

Auriga's fifth brightest star caught the attention of Otto Frisch in 1821. It had dropped to 4th magnitude and he asked for reports from other observers. It dimmed again in 1848 during a flurry of variable star studies. After minima in 1872 and 1902, Hans Ludendorff deduced a 27.1 year eclipse period. In 1915 Henry Norris Russell proposed his mathematical theory for binary stars, which was successful except for Epsilon Aurigae. Harlow Shapley proposed that a 15 solar mass star was eclipsing the primary, but that it was invisible. After the next eclipse, Stromgren, Struve and Kuiper proposed the companion was a huge infrared star, the largest star in the universe. In 1965 Su-shu Huang proposed eclipse by a disk, which appeared like a brick in profile. In 1982, UV spectroscopy, IR photometry and polarimetry were applied. It was determined that a hot source is present, the eclipsing body is cold, and the eclipse is geometrically off center. 1983 was the 4th eclipse of the 20th century. Since then we added HST, the Spitzer Space Telescope, XMM and CCD detectors. 2010 was the first eclipse of the 21st Century. Amateur observations helped create the most complete eclipse light curve ever. Interferometric imaging detected the dark disk directly. IR spectra detected CO and He components of the disk. Optical spectra confirmed the disk rotation model. UV spectra

implied accretion phenomena on the B star . . . and more. Amateur observations helped create a very complete light curve. Dozens of observers contributed thousands of data points. An unresolved problem is out of eclipse variations. Are these intrinsic to the disk, or due to an active F star surface? Interferometric imaging provided direct detection of the eclipsing body. Detecting the 2 milliarcsecond diameter is like seeing a parking space at Mars distance. The IR spectrum is fit by the F primary star, accompanied by a B star shrouded in the disk. It is a classic Algol eclipsing binary with the twist that the accretion disk is young. The disk probably arose from mass transfer as the F star evolved through a nuclear transition. The F star is probably in a short, high luminosity state similar to post-AGB objects. It is 2 to 3 solar masses and 135 solar diameters. The B star is type B5V, 15,000 K, 3 solar diamters and 5.9 solar masses. The disk has a 7.6 AU diameter, 0.457 AU thick, and 1 solar mass. It is at 550 K. The UV spectrum suggests 1 earth-mass per year is accreting. The age of the disk implies there is replenishment, perhaps from planetesimal collisions. What are our next steps? Interferometric imaging could detect phenomena such as giant convection cells. The disk should be observable anytime in IR by the JWST. Spectroscopy and polarimetry during eclipse are showing signs of disk substructure. This is in progress. Amateurs can continue to contribute. See:
www.citizensky.org
www.aavso.org

Many variables await our visual, CCD and DSLR observing. For more details see:

D.W. Hoard, S.B. Howell, R.E. Stencel. Taming the Invisible Monster: System Parameter Constraints for epsilon Aurigae from the Far-ultraviolet to the Mid-infrared. Astrophysical Journal 714:549-560. 2010.

Dr. Bob Stencel enjoyed his part this spring in cleaning the objective of the 20 inch refractor at Chamberlin Observatory. He continues to actively advocate for dark skies and promote amateur astronomers' involvement in research.

From Robert Arn: More Summer Nightscapes

This one called "Unpaved Roads". Most the data comes from last Thursday night after the LAS meeting, taken from near the ghost town of Carr, CO. The moon/clouds worked perfectly for me; the moon was bright enough to capture the landscape and then storm clouds hid the moon allowing me to collect the data I needed to push the Milky Way.

http://www.astroarn.com/nightscape/h37de7fc1#h37de7fc1

Cheers,
Robert Arn

From Gary Garzone: WUTS 2011, a Foxtastic Weekend

Another Fox tastic weekend. Wuts up was great as usual, probably why it is our best star party site, high and dry, usually good transparency too. I arrived on Wednesday night, looking cloudy but always a positive attitude for clearing. Well Wednesday night was sucker holes and poor transparency. I slept for hour or so then back out around midnight till 1:30 2 am when clouds did us in, so we gave up viewing for the night.

Thursday night ,was good all night, few stray clouds on horizons, never a problem. Pretty good seeing going on too. Saturn early evening was good, Jupiter around 3 am or so pretty high in sky by then. Dew was not too bad, cold , it did freeze on box of the 30 scope by 4 am or so.
Friday night was even better, the best of all the nights, clear not so cold, no dew really to speak of. I stayed up till 4 am. Saturday night was cloudy mostly with very poor transparency and not as good a seeing as the night before, but still good enough for views of Jupiter and Saturn.not much real viewing going on, but did manage few hours. Too many names to name but we had a good crowd from Colorado as usual. DAS, NCAS, LAS, BASS people. Close to 200 people maybe? Mike Hotka had his rebuilt scope, very nice, Servo cat and all, looks good. John Figoski's rebuilt scope too, some good ATM'er scopes there. Glenn F. Dave D and even Steve Lynch, All the old dark sky marines. Bill Tschumy had his fine refractor, great views . Ken O. had his refractor too. Thursday night Stan J. and I did a flat galaxy list, we worked on with the 30 scope, few were challenging even with big scope.

Vern showed up for Friday night, best of the nights. Moon man Andrew Planck and his wife Susan also came by. John Warren showed up too. Joe Gafford's cool dome tent with NGT 18 inch scope nice set up. Randy C from Astro systems had a 18 inch F3.5, yes, F3.5 very fast short stubby dob scope. Robert Grover, Greg, few NCAS guys set up next to me. Greg won the 14 mm 102 degree eyepiece. Wow nice views Sunday morning about 4 am or so? Everyone was asleep but skies did open back up nicely by early morning hours.

Thanks to CAS and LASSO clubs, Marty and Marcy, Marvin, Robert Roten, and others who have always volunteered and kept things going for 21 years of WUTS observing. Wow!
GG

From Mike Prochoda: Rocky Mtn Natl Park August 5

Astronomers:

We had an excellent turnout for the RMNP public night yesterday (Friday) and the skies remained clear for most of the night.
I arrived at Upper Beaver Meadows at about 7:20 PM, and the turnabout parking area was already packed - with a line of

parked cars extending about 200 feet beyond the main observing field. I had to temporarily double-park my car to unload my dob and then find a distant parking spot, as did some other astronomers who arrived after I did. A large group had arrived early and were having a picnic on the observing field as the sun was setting in the West. RMNP ranger Cynthia Langguth gave her usual excellent introduction to the night sky and discussed the evils of light pollution as twilight began. Afterwards, the crowd was introduced to the astronomers on the observing field and lines began to form at all of the telescopes. I did not get a count of the crowd, but I would estimate it was one of the larger crowds I have seen at RMNP. There seemed to be more small kids at tonights event than I have seen in the past. Parked cars extended to beyond the Eastern bend in the road where it disappears from view behind a hill.

The observing program began early, so most of us were showing off the first-quarter moon for almost 45 minutes before the first stars and Saturn became visible. Once twilight deepend, Saturn and showpiece double stars became the main fare. During this time, I always had a line of at least 20 people at my dob. As usual, the temperature plummetted and the crowd thinned to about 1/2 of it's former size by the time twilight ended, though the bright moonlight made it difficult to tell exactly when the skies had fully darkened. The brighter parts of the Milky Way were visible despite the moonlight, and M11, M5, M22, M13, NGC 7789, M8, M17, M27, and M57 became the showpiece objects. The progressive temperature drop drove all but the hardiest campers back to their tents and RVs, and by the time the moon dipped behind the hills, I had only a handful of people visiting my scope sporadically. Bill Tschumy was holding court with his TEC 180 Fluorite Apo refractor and had the biggest crowd during the latter part of the evening. He does a fantastic job with public outreach and his descriptions and analogies of the cosmic distance scales kept the group at his scope spellbound well past the time that many others had aleady left. By true moonset, only a few die-hards (who had dressed more warmly than the others) remained.

Both Bill Tschumy and I hunted down the asteroid Vesta in Capricornus, and several visitors got to see this bright asteroid which the Dawn spacecraft
is currently orbiting (and sending us some amazing close-up photos of it's tortured surface). I tried for an unaided-eye observation of Vesta and was able to faintly see it, however, I may have been "cheating" since there was a close pair of stars right next to Vesta, both being about 1 magnitude fainter than the asteroid. I may have been seeing the combined light of all three objects visually. I will try again on another night sometime soon to see if I can get a "true" naked-eye view (before the bright moon interferes with the view for the next couple of weeks).

John Warren had set up his "Frankenscope" 12.5" homemade dob right next to my scope, and after moonset, John and I began observing in earnest and pulled-in some interesting and pretty objects. The Milky Way now showed it's full grandeur and was nicely marbled and mottled. There were a few high hazy clouds to the East along with significant moisture/aerosols in the air which scattered the light pollution of the Front Range to about 45 degrees high on the Eastern and SE horizons. Views were much darker at the zenith and to the West. Though we had little or no clouds, the transparency was not as good as I have seen it in the past, and the seeing was definitely sub-par. From the first views of the moon and double stars, to Saturn, and star clusters, the night only afforded shimmering views of Solar System objects and somewhat bloated star images. Not the best night overall, but no real clouds ever materialized.

By 1:00 AM most of the astronomers had left the field and John Warren and I stayed to "mop up" what was left of the night. I hunted down a few objects from some of Sue French's recent "Deep Sky Wonders" Sky & Telescope magazine columns that I had not seen in the past. These included IC 10 (dwarf galaxy in Cassiopeia), NGC 129, 136, and 225 (open clusters in Cassiopeia) and vdB 1 (nebula in Cassiopeia). I also found NGC 6791 (open cluster in Lyra) which is a very rich, but faint and low-surface-brightness cluster located in a rich stellar field. It was not a very good night for galaxies because of the light pollution from the Front Range and the moisture in the air, but I did get a parting view of the supernova in M51 (getting fainter but still visible in an 18" dob). We finished the night with decent views of the N. America Nebula (NGC 7000), the Veil Nebula, The Crescent Nebula (NGC 6888) and the Pleiades rising in the East. I was using a TeleVue 31 mm Nagler (The Terminagler) for wide-field views of these objects in the 18" dob, and this eyepiece did not disappoint (especially when paired with a Lumicon 2" UHC filter for the nebulae). We tore down our scopes at about 3:30 AM more due to exhaustion than the quality of the night, and packed up for the ride home. Overall, I think that most folks had a really nice night and it's always a pleasure to show-off the wonders of the night sky to the public.

- Mike Prochoda (Estes Park)

From Rob Grover: Keota Observing Report Aug 24

It was a good night out in the grasslands last night. I arrived about 6PM and Mike Hotka was about 5 minutes behind me. David Dunn showed up around sunset.

Evening looked iffy initially. Lots of high, thick haze, coming out of the NW with a fairly stiff breeze. Both died out as the sunset and it began to cool down.

Mike had a binocular observing list he worked through. As he was getting started, we watched a tumbling rocket booster near Sagittarius.

David supplied the aperture for the night. Wonderful views of the Veil, Crescent, M22, M17, M16 and M31. Also bagged Jones 1 before he packed up.

I spent the night collecting photons. Managed 15 ten minute exposures on my primary target and a dozen 5 minute shots of a secondary image. After taking my darks, I packed everything up, crawled into bed about 3:45AM and got a couple hours sleep before heading home. Will get to the processing later today. A quick peek at one frame looks encouraging.

Need a little more sleep and have to run to Longmont for lunch today, so it will be a while before
I can get these images out.

Only annoying light out there was from two burn-off flames. One NW & one SW. Careful parking & setup will make them no bother at all.

Time for a close visual inspection of the inner eyelids.

Well worth the trip!

Robert Grover

From Chris Peterson: Colorado Perseids 2011

For those who didn't stay up, or want to relive last night's shower, I've posted images, videos, and other data at http://www.cloudbait.com/science/perseid2011.html

My allsky camera collected 105 bright Perseids last night, and 361 since August 4. Despite the bright Moon and none too transparent skies, this year's Perseids has been one of the best for quite a while.

Chris

From Andrea Schweitzer: Solar Flares: What Does it Take to be X-Class?

Contacts:
Rob Gutro / Karen Fox
+1 301-286-4044 / +1 301-286-6284
robert.j.gutro@nasa.gov / karen.c.fox@nasa.gov

Text, images, and movie:
http://www.nasa.gov/mission_pages/sunearth/news/X-class-flares.html

Solar flares are giant explosions on the Sun that send energy, lightand high speed particles into space. These flares are often associatedwith solar magnetic storms known as coronal mass ejections (CMEs). The number of solar flares increases approximately every 11 years, and the Sun is currently moving towards another solar maximum, likely in 2013. That means more flares will be coming, some small and some big enough to send their radiation all the way to Earth.

The biggest flares are known as “X-class flares” based on a classification system that divides solar flares according to their strength. The smallest ones are A-class (near background levels), followed by B, C, M and X. Similar to the Richter scale for earthquakes, each letter represents a 10-fold increase in energy output. So an X is ten times an M and 100 times a C. Within each letter class there is a finer scale from 1 to 9. C-class and smaller flares are too weak to noticeably affect Earth. M-class flares can cause brief radio blackouts at the poles and minor radiation storms that might endanger astronauts.

And then come the X-class flares. Although X is the last letter, there are flares more than 10 times the power of an X1, so X-class flares can go higher than 9. The most powerful flare measured with modern methods was in 2003, during the last solar maximum, and it was so powerful that it overloaded the sensors measuring it. The sensors cut out at X28.

The biggest X-class flares are by far the largest explosions in the solar system and are awesome to watch. Loops tens of times the size of Earth leap up off the Sun’s surface when the Sun’s magnetic fields cross over each other and reconnect. In the biggest events, this reconnection process can produce as much energy as a billion hydrogen bombs.

If they’re directed at Earth, such flares and associated CMEs can create long lasting radiation storms that can harm satellites, communications systems, and even ground-based technologies and power grids. X-class flares on December 5 and December 6, 2006, for example, triggered a CME that interfered with GPS signals being sent to ground-based receivers.

NASA and NOAA -- as well as the US Air Force Weather Agency (AFWA) and others -- keep a constant watch on the Sun to monitor for X-class flares and their associated magnetic storms. With advance warning many satellites and spacecraft can be protected from the worst effects.

# # #

Sun Unleashes X6.9 Class Flare [Aug. 9, 2011]:
http://www.nasa.gov/mission_pages/sunearth/news/News080911-xclass.html

Recent Solar Events:
http://www.nasa.gov/mission_pages/sunearth/multimedia/Solar-Events.html

Space Weather Frequently Asked Questions:
http://www.nasa.gov/mission_pages/sunearth/spaceweather/index.html

View video of 2003 Halloween Solar Storm:
http://www.nasa.gov/multimedia/videogallery/index.html?media_id=17956765

From Tom Teters: WISE Mission Finds First Trojan Asteroid Sharing Earth's Orbit

The full version of this story with accompanying images is at: http://www.jpl.nasa.gov/news/news.cfm?release=2011-230&cid=release_2011-230

PASADENA, Calif. - Astronomers studying observations taken byy NASA's Wide-field Infrared Survey Explorer (WISE) mission have discovered the first known "Trojan" asteroid orbiting the sun along with Earth.

Trojans are asteroids that share an orbit with a planet near stable points in front of or behind the planet. Because they constantly lead or follow in the same orbit as the planet, they never can collide with it. In our solar system, Trojans also share orbits with Neptune, Mars and Jupiter. Two of Saturn's moons share orbits with Trojans.

Scientists had predicted Earth should have Trojans, but they have been difficult to find because they are relatively small and appear near the sun from Earth's point of view.

"These asteroids dwell mostly in the daylight, making them very hard to see," said Martin Connors of Athabasca University in Canada, lead author of a new paper on the discovery in the July 28 issue of the journal Nature. "But we finally found one, because the object has an unusual orbit that takes it farther away from the sun than what is typical for Trojans. WISE was a game-changer, giving us a point of view difficult to have at Earth's surface."

The WISE telescope scanned the entire sky in infrared light from January 2010 to February 2011. Connors and his team began their search for an Earth Trojan using data from NEOWISE, an addition to the WISE mission that focused in part on near-Earth objects, or NEOs, such as asteroids and comets. NEOs are bodies that pass within 28 million miles (45 million kilometers) of Earth's path around the sun. The NEOWISE project observed more than 155,000 asteroids in the main belt between Mars and Jupiter, and more than 500 NEOs, discovering 132 that were previously unknown.

The team's hunt resulted in two Trojan candidates. One called 2010 TK7 was confirmed as an Earth Trojan after follow-up observations with the Canada-France-Hawaii Telescope on Mauna Kea in Hawaii.

The asteroid is roughly 1,000 feet (300 meters) in diameter. It has an unusual orbit that traces a complex motion near a stable point in the plane of Earth's orbit, although the asteroid also moves above and below the plane. The object is about 50 million miles (80 million kilometers) from Earth. The asteroid's orbit is well-defined and for at least the next 100 years, it will not come closer to Earth than 15 million miles (24 million kilometers). An animation showing the orbit is available at: http://www.nasa.gov/multimedia/videogallery/index.html?media_id=103550791 .

"It's as though Earth is playing follow the leader," said Amy Mainzer, the principal investigator of NEOWISE at NASA's Jet Propulsion Laboratory in Pasadena, Calif. "Earth always is chasing this asteroid around."

A handful of other asteroids also have orbits similar to Earth. Such objects could make excellent candidates for future robotic or human exploration. Asteroid 2010 TK7 is not a good target because it travels too far above and below the plane of Earth's orbit, which would require large amounts of fuel to reach it.

"This observation illustrates why NASA's NEO Observation program funded the mission enhancement to process data collected by WISE," said Lindley Johnson, NEOWISE program executive at NASA Headquarters in Washington. "We believed there was great potential to find objects in near-Earth space that had not been seen before."

The spacecraft was built by Ball Aerospace & Technologies Corp., Boulder, Colo. Science operations and data processing take place at the Infrared Processing and Analysis Center at the California Institute of Technology in Pasadena. Caltech manages JPL for NASA.

For more WISE information visit: http://www.nasa.gov/wise .

Best Looks

Moon	By Jupiter Sep 15 and 16; by Mars Sep 23
Mercury	Low in E at sunrise 1st week. By Regulus Sep 9
Venus	Hidden in glare
Mars	By Pollux & Castor midmonth., M44 Oct 1
Jupiter	High in S middle of the night
Saturn	In SW in evening 1st week
Uranus	Middle of the night in Pisces
Neptune	In evening in Aquarius
Pluto	In S in evening in Sagittarius

International Space Station Passes for Loveland – Fort Collins September 2011

Date	Mag	Starts			Max. altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
1 Sep	-2.9	19:51:26	10	NW	19:54:28	47	NNE	19:57:27	10	ESE
1 Sep	-1.1	21:28:12	10	W	21:30:15	17	SW	21:30:16	17	SW
2 Sep	-2.3	20:29:12	10	WNW	20:32:11	37	SW	20:34:27	14	SSE
4 Sep	-1.1	20:08:53	10	W	20:11:14	20	SW	20:13:34	10	S
6 Sep	-0.1	19:49:23	10	WSW	19:50:11	11	SW	19:50:58	10	SW
18 S	-1.1	06:25:54	10	S	06:28:28	23	SE	06:31:04	10	E
19 S	-0.1	05:29:28	10	SE	05:29:55	10	SE	05:30:23	10	ESE
20 S	-2.3	06:03:41	10	SSW	06:06:43	43	SE	06:09:45	10	ENE
21 S	-1.0	05:06:45	15	SSE	05:08:02	19	SE	05:10:20	10	E
22 S	-3.4	05:42:56	21	SW	05:44:54	83	SE	05:48:05	10	NE
23 S	-1.7	04:46:43	30	ESE	04:46:43	30	ESE	04:48:59	10	ENE
23 S	-2.1	06:19:17	10	W	06:22:07	28	NNW	06:24:56	10	NE
24 S	-3.2	05:22:38	49	WNW	05:23:03	54	NNW	05:26:10	10	NE
25 S	-0.6	04:26:12	19	ENE	04:26:12	19	ENE	04:27:13	10	ENE
25 S	-1.6	05:58:26	13	WNW	06:00:20	20	NNW	06:02:49	10	NNE
26 S	-1.8	05:01:54	29	N	05:01:54	29	N	05:04:04	10	NE
27 S	-1.2	05:37:31	14	NW	05:38:30	16	NNW	05:40:33	10	NNE
28 S	-0.6	04:40:52	15	NNE	04:40:52	15	NNE	04:41:47	10	NNE
28 S	-0.7	06:14:55	10	NNW	06:16:00	11	N	06:17:11	10	NNE
29 S	-0.9	05:16:22	13	NNW	05:16:34	13	NNW	05:18:13	10	NNE
30 S	-0.6	05:53:05	10	NNW	05:54:08	11	N	05:55:10	10	NNE

ISS predictions can be obtained from:
http://www.heavens-above.com/main.aspx?lat=40.4997&lng=-105.05736&loc=Fort+Collins+CO+USA&alt=0&tz=MST