The Objective View

July 2011

Newsletter of the Northern Colorado Astronomical Society

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Next Meeting: July 7 7:30 pm

Epsilon Aurigae: Exiting Eclipse

by Dr. Robert Stencel, University of Denver

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

Aug 4 Ray Heinle Studying Energy, Livermore - Az - Colo
Sep 1 Bob Michael Atatcama Desert: Earth's Exoplanet
Oct 6 Mike Hotka Constructing a Dobsonian Telescope

City of Fort Collins Natural Area Program at Sunset

Fossil Cr Reservoir July 9, Aug 12
Bobcat Ridge July 21, Aug 25

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

Larimer County Park Skygazing

Flatiron Reservoir July 23
Carter Lake Aug 6

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

Rocky Mountain National Park Skygazing

Upper Beaver Meadows Trailhead at dusk.
July 8, 22; Aug 5, 19

Boyd Lake State Park Skygazing July 8

Dark Site Observing Dates
July 1, 2, 29, 30: Keota or RMNP, ask FRAC newsgroup

Other Events

Chamberlin Observatory Open House, 7 to 10 pm
July 9, Aug 6, Oct 1, Nov 5, Dec 3
303 871 5172 http://www.du.edu/~rstencel/Chamberlin/

Cheyenne Astronomical Society Foxpark WY
Weekend Under the Stars July 28-30
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 July 9 and 23; 7 pm July 28 http://www.angelsabove.org/

Little Thompson Observatory, Berthoud July Closure for Maintenance http://www.starkids.org

Longmont Astronomical Society 7 pm July 21. TBA IHOP 2040 Ken Pratt Blvd http://www.longmontastro.org/

June 2 Program: Cosmic Duos: When Binary Stars Interact, by Max Moe

Binary stars can be detected in several ways. Direct imaging on a single occasion gives a projected separation. Sequential imaging is needed to determine an orbit. Optical binaries have a greater than 1 light-year separation so are not gravitationally bound. Interferometry can be applied directly, with visible or radio wavelengths. Speckle techniques compensate for atmospheric seeing. Adaptive optics use a reference star and actively compensate with a flexible mirror. Astrometry and proper motion measurements define full binary masses and orbital elements if 6 epochs are monitored. Spectroscopy reveals binaries too close for other methods. The effect of radial velocity is to cause shifts in the position of absorbtion lines of the component stars. Eclipsing binaries have characteristic light curves. The mass, radius, luminosity, temperature relations of main sequence stars is determined from eclipsing binaries. Presence of a close companion can be determined from the composite spectrum. Examples are near-infrared excess and distinctive absorbtion lines. A light curve can display irradiation effects or ellipsoidal variations. Gamma-ray, X-ray and or emission from accretion jets or shocks help to define systems with more massive end-stage companions. LIGO is designed to detect gravitational waves

from close massive systems, still searching. The spacecraft system LISA was cancelled. Max showed plots of main sequence binary separation distribution and binary frequency vs spectral class. 90% of type O are multiple, 60% of F&G type are, as are 35% of M-type. For nearby G-dwarfs, the mass ratio peaks around 0.25 and the count drops as the mass ratio approaches 1. Plot of eccentricity v log of period gives a scattered distribution. We then reviewed evolution of stars and the contrast in stellar lifetimes between red dwarfs, Sun-like stars, giants and supergiants. Binary stars are born at the same time, and the more massive component evolves off the Main Sequence first. Mass loss and transfer depends on orbital separation, mass and the stage of evolution of both stars. Max then showed a video of Roche-lobe overflow from a subgiant donor to MS accretor. An X-ray accretion disk develops. At high mass accretion rates, a microquasar develops. SS433 is an example. In a contact binary, both stars fill their Roche lobes. If both stars are MS or subgiant the pair is stable. If an RGB, AGB or RSG donor, unstable mass transfer occurs. The less massive star spirals in, and the cores merge. Or, the envelope is ejected leaving a short-period WD-MS/BD binary. DeMarco and Moe (2005) published a simulation of planetary nebula evolution from binary precursor. A close massive pair should produce gravitational waves and a quadropole moment. Max then reviewed binary phenomena. Blue stragglers are merger products in globular clusters. The Southern Crab Nebula is a symbiotic. X-ray binaries can switch on or off, or be steady, periodic, irregular and give soft or hard x-rays. Mass and spin of a black hole can be measured for X-ray binaries. A pulsar is a neutron star. Jets collimated by off-axis dipole magnetic field carries away angular momentum, so pulsars spin down. In binary systems, the spin rate is maintained. The fastest has a 1.4 millisecond period, 716 revs per second. Coalescence of two neutron stars gives a short gamma ray burst. A tidal disruption event can give several gamma ray flares. An event in April 2011 was likely a star encountering a supermassive black hole, not a true binary. Cataclysmic variables have eruptions due to accretion onto white dwarfs. Classical novae recurrent novae and dwarf novae are in this category. Mass ejections and light echoes have been seen. Type 1a supernovae are explosions of the entire WD star as it approaches the Chandrasekhar limit. They are standard candles because their intrinsic luminosity can be determined by their decay rates. Observations of high redshift Type Ia supernovae have demonstrated the universe is accelerating due to dark energy. The universe is surprisingly flat. The equation of state of dark energy is fairly constant. Most of the Fe peak elements come from thermonuclear fusion during Type Ia SNe. Max then gave a few results from his research. He has looked at common envelope formalism. Lower mass companions have longer orbital decay timescales due to small dynamical friction forces. Decay times for lower mass companions are longer than the dynamical timescale of the giant. This allows the giant to refill its giant structure, lifting the envelope. Basically, lower mass companions are more efficient at tapping internal energy of the primary giant. Max has a long interest in binaries and planetary nebulae. About 90% of PN are non-spherical. There is a problem with inadequate mass loss rates in single stars under 2.4 solar masses. A stellar companion can provide shaping of the PN, plus give the necessary enhancement in mass-loss rates via CE evolution and/or tides. Are there enough binaries to account for observed PN? The Milky Way has 2100 known PN and the projected total is ~11,000. This is much smaller than the number of predicted PN, 80,000 if all stars from 0.8 to 10 solar masses produce a visible PN. If PN generation is estimated using interacting binaries with primary between 0.8 and 10 solar masses, the projected total is 7200. So, if 65% from interacting binaries, 35% from single stars and wide binaries greater than 2.4 solar masses, observation fits this proportion. The number of PN in the bulge, central star mass distribution, planetary nebula luminosity function, are also more consistent with the predictions using the binary paradigm. They are discrepant with the single star scenario. Max is continuing to study the problem: Why is the observed close binary fraction of central stars only 10-15%?

Photography at Night, a New eBook by Robert Arn

Greetings All,

After many long nights under the stars and in front of a computer I would like to announce the release of my first eBook, "Photography At Night: An Introduction to Astrophotography on a Budget".

Learn how to start taking images of the Universe around you. This eBook will guide you through the process of producing breathing-taking views of the night sky - starting with just a basic camera! As your aspirations for night-time photography grow, explore how a couple simple tools will unlock views that are quite literally out-of-this-world! With this 155 pages eBook, absolutely no prior experience in astronomy or photography is needed - just a desire to capture the beauty of the world above!

You can purchase this eBook on my new website at:

www.astroarn.com/books-tutorials

Furthermore, to get up-to-date news on new images, new eBooks, or new tutorials I produce you can follow me on Facebook or Twitter by clicking on the links on the bottom of my homepage

www.astroarn.com

Though I will continue posting this information to the FRAC, NCAS, (and in the future) LAS mailing lists as well.

If you have any questions please feel free to contact me!

Useful Skies,

Robert Arn
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robert@astroarn.com

From Dave Dunn and Mike Prochoda: RMSS 2011

As the new Moon was on the July 4th weekend and knowing the hills would be full of campers (with atv's) I pre registered for Star Stare this year. Having purchased property two years ago the CSAS now has a permanent home for their annual star party. Located just outside of Gardner Colorado the site is a nice gently sloping pinion forest with a large main field on the road in along with a south and east meadow. After walking around all the sites I settled on the east meadow as it offered the best option of shade for camping along with nice south and east views. Being the least populated area I hoped there would be less dust as the soil quickly turned to a fine powder in the high traffic areas.

Reports from Thurs night had smoke and haze blowing in from the fires south in New Mexico though they cleared late and views were very steady. Having arrived early Fri. evening there was enough light left to get camp established, have dinner and get ready to observe. Conditions were clear (no clouds) but transparency and seeing seemed to suffer most of the night. I split my time between the telescope and sitting back with binoculars (which is still my favorite way to observe) working the southern and eastern sky. My session ended with views of a boiling Jupiter as it cleared the ridge around 3:30 a.m.

Saturday morning there was a thick haze of smoke nearly obscuring the surrounding mountains that dissipated during the day as the winds shifted around. Did the ATM walkabout, only 6 entries so all received an award! Included were a nice bino parallelogram mount, folded 4" refractor, a compact 10" reflector and a wonderfully engineered 22" home built fully driven newtonian.

There was a brief thunderstorm and rain shower prior to the door prize giveaway. Also a 13mm Ethos was raffled off in a separate drawing . It was nice to see the majority of door prize items went in the kids only drawings, given away were 6 Galileo scopes along with binoculars, books and charts for those aspiring astronomers.

As the evening progressed the cloud cover that had brought the rain earlier began to break up and by 11:00 pm the sky had mostly cleared with a few stray clouds drifting thru. With the breeze out of the north the smoke and haze were not as noticeable and the sky appeared darker. I never really noticed any light domes but my view to the north was obscured more than in the main field.

I did have a fairly good 3G signal on my ATT smartphone which was nice for checking weather reports when the thunderstorms rolled thru.

Congratulations and thanks to the CSAS for putting on a well organized and activity filled event, a great star party!

DJD

Astronomers:

I attended RMSS 2011 near Gardner Colorado from Wednesday June 29th through Saturday night July 2nd, leaving on Sunday morning. I have attended every RMSS since 2006, and 2011 was the best to date for observing. I arrived early Wednesday afternoon to hot dry conditions, clear blue skies, and puffy cumulus clouds. Unfortunately, by later that afternoon, heavy brown smoke began pouring into the Huerfano river valley from the fires in New Mexico, allowing one to observe the blood-red sun naked-eye without filtration. The sunset was amazingly colorful, but the skies did not clear that evening. We did get views of a few bright double stars through the thick smoky muck, which demonstrated excellent seeing, but almost zero transparency. It was kind of cool to see the Epsilon Lyrae components nicely split, but being deep orange in color! By midnight, with no signs of clearing, I called it a night.

Thursday turned out to be much better and by late afternoon most of the smoke had blown out of the valley. We once again had above-average seeing with pretty good transparency, only limited by some lingering smoke most visible near the horizon (there was a fair amount of extinction near the horizon in all directions). I did a lot of galaxy observing in the Virgo-Coma-Canes Venatici regions and the good contrast suggested an above- average night of observing overall. Globulars looked really nice due to the superior seeing - they showed nice crisp pinpoint stars.
Saturn was crisp and tight and the Cassini division was easily visible even though the rings are not that wide-open presently. I observed until just before AM twilight.

Friday night was partly-cloudy early and then mostly cleared after astronomical twilight had ended. This was another excellent night of above-average seeing with fair to good transparency. I could see Magnitude 6.5 stars at the zenith and ended up observing all manner of DSOs all night until dawn shut me down.

Saturday started out clear, but began clouding up early. The Clear Sky Chart predictions showed overcast skies with terrible seeing and zero transparency predicted for Saturday night. This drove about 1/3 of the attendees back home by the late afternoon. We did have a couple of windy thunderheads blow through during the day, but almost no rain (only a sprinkle or two). I diligently followed the herd and packed-up my scope early in the day, but after the RMSS giveaway and raffle, I realized my mistake. The skies were a deep blue just after sunset with nary a cloud in the sky. I ended up mooching observing time with
Bill Tschumy and his wonderful TEC 180 Fluorite APO refractor, along with spending time in my deck chair observing with my 16 x 60 mm binoculars. The seeing was superb on Saturday night and we were able to see the companion of Antares through Bill's refractor. We spent most of the first 1/2 of the night observing doubles, and later observed some open clusters and a couple of galaxies through Bill's scope. I hunted down every Messier object above the

horizon using my binos. By 1 AM I was just too exhausted from 3 nights of straight observing, that I had to turn-in, leaving Bill to continue observing (though not for long since he was also tired). There were a few passing clouds on Saturday night, but this only occasionally interfered with our intended astronomical targets.

Overall, a fantastic 3 out of 4 nights of clear observing with warm evenings (only a sweater was needed) and good to excellent seeing every night. Though the transparency was somewhat attenuated by the smoke from the wildfires, it never really seemed that bad to me compared to previous years at the RMSS site (Wednesday night excepted). CSAC did an outstanding job once again, though attendance was down from previous years (probably due to the 4th of July weekend and ALCON being the same weekend in Bryce Canyon). I'll definitely be planning on attending again next year!

Clear Skies,

- Mike Prochoda (Estes Park)

Independence Mountain Report from Rob Grover and Tim Antonsen

Hi All –

Perhaps this report should have been titled "From Mosquito Central". Those little pests were thick & hungry up there. I think I'm one large mosquito bite today. They weren't even slowed down by my 95% DEET! Not only were they thick, they persisted through the nights as well. From time to time, they seemed to thin out a bit, but were a constant source of aggravation.

Mosquitoes weren't the only source of insect life up there. The flowers were in full bloom. There were some particularly prolific white flowers just covered in iridescent beetles. Nature was taking its course and there was quite the beetle orgy going on up there.

Well, enough of the bug report. On to the sky & stars. Tim Antonsen went up on Friday. David Auter & I joined him on Saturday. Tim said the sky Friday night was spectacular. I can affirm that the seeing on both Saturday & Sunday nights was incredible. Tim was boring into the cores of globs @ 300x – 400x and the views were amazing. I spent most of my time at around 200x and was quite happy in that range.

On Saturday night, a family that owns some land nearby came up and we had an impromptu outreach event. There were about a dozen people visiting and they got great looks at Saturn, M3, M5, M27, M57, M20, M8, M51, the Veil. This same group was up there one night last year and said they were hoping we would be back this year. The kids in the group were full of questions and awed by many of the views.

Al from Denver also joined us up there, arriving after dark with his nice Starmaster scope. Tim was worn out from the long Friday night and all the work showing things to our guests. He turned in a little early. David was trying to figure out what to image and ended up just doing some hunting & observing with his camera – but collected no data. I spent time hunting down a few fainter galaxies. Managed to get Stephan's Quintet fairly early, much closer to the horizon than I did last year. The transparency was just a little bit worse on Saturday, so the dimmer targets were best when they rose above about 50 degrees. I spent time just hopping around the familiar targets and enjoying the sights without really keeping track of what I was viewing. I went up without any plan and didn't make one while there. I do remember especially nice views of the Crescent, the Veil, the Swan, the Lagoon, the Trifid & the Eagle in particular.

Sunday night, Tim found some interesting targets that were near brighter Messier objects. Near M53 (a globular cluster), is NCG 5053, another globular. It is large but quite faint. With the ability to use higher power, this glob just began to show sparkles in my 13.1" @ 200x. Near M5, there is a galaxy group. NGC 5846 is among these small, but interesting galaxies. I could get at least 4 of them in the same field in the 22 Nagler. They are a quite pleasing set of galaxies to observe. One appears to have a double core and perhaps another is a barred spiral. Later, I borrowed Tim's 30mm ES 82 degree eyepiece for some final looks at the North American, the Veil, the Lagoon and the Swan. With the O-III filter, the Swan had more detail and extended farther than I'd ever noticed. The Veil was amazing, showing many tendrils that are obscured by the brighter sky and lower elevation of the Front Range. The transparency was really nice Sunday – better than Saturday. The seeing remained fantastic through the weekend.

I took the imaging rig with me and was hoping to get something done while up there. Unfortunately, the powerpack I use to run the mount decided to finally give up. Can't complain since it gave me nearly 10 years of faithful service as a jump starter, spotlight, and general backcountry friend. The last three years it received the bulk of use as the power for the CG5-GT. I wasn't set up to power both the computer and the mount from the deep cycle, so I just played with the 8" Newt on my (new to me) Orion Sirius mount. The built in polar alignment scope works great. I put the scope on M27 and let it track. After 2 hours, the Dumbell was still in the center of the field of view. I am impressed. The 8: Newt is probably too much scope for imaging with that mount, as vibrations seemed to take a long time to settle after focusing – even using the motor focus control. Should be great with a 3 or 4 inch refractor, though – which is the intended use for this mount.

Sunset Saturday was particularly beautiful. Some clouds to the west gave the appearance of a YES album cover. The setting crescent moon was razor thin and just spectacular. Unfortunately, my camera was packed away and I knew the view would have been over by the time I got it out to take photos.

All in all, a wonderful weekend – except for all the mosquitoes. There's still a whole lot of water in the North Park rivers & streams. Much of the low lying hay meadows are still flooded. The grass and plants on top of Independence Mountain are very green. Still lots of snow in the Mt. Zirkel Wilderness as well. I'm sure some of those snowfields will persist through the summer this year.

Hope everyone had a fun 4th!

Robert

From Tim:

It was good to be up at Independence Mountain with Kris last weekend; out of the heat, into the clouds ... of mosquitoes! Robert Grover and David Auter, were there, too along with Al "Starmaster" (from Denver; sorry, haven't caught the full name).

As expected, the sky was great. Of course, on the weekend of July 4, it's mandatory you visit M80 and I did.
Seeing was unexpectedly good most nights. On Sunday night the seeing was very good; I was regularly pushing lesser globs to 400x and the stars stayed crispy. The Grand Champion sight, though, was moonset on Saturday: a razor-thin crescent hung in an orange sky, wrapped by dark and distant wisps of virga. It was just exquisite.

I also had the pleasure of touring a fine grouping of galaxies just west of M5 (NGC5806, 5813, 5831, 5838, 5839, 5846 & 5846A, and 5850). All fairly bright and interesting, esp. 5846 & 5846A, which you'd swear must be interacting but don't seem to be in the Arp catalog, so maybe not. I'm proud to say I called 5850 as a barred spiral with no prior knowledge of that fact!

The mosquitoes were intense at times, but I held them at bay with regular baths in Picaridin. I'm also looking into Permethrin clothing treatments; I've heard good things. Between Permethrin-treated clothing and 20% Picaridin on exposed skin, they say you can get 99% bug-free even in the tropics. Sounds good to me!

I've attached a Google Earth KMZ file in which I've marked a few observing sites I've used. I should add Hermit Park near RMNP, though it is a fee-based county park.

In the KMZ file, look for the "Potholes Reservoir" locations, as well as the "Dinner Station Campground". These are all in Taylor Park, west of Buena Vista. As far as I can tell, this is observing Nirvana in Colorado. There could be light domes from Buena Vista, 27 miles SE, or from Leadville, also 27 miles NE. However, neither town is very big, and both are screened by 14000' mountains. Gunnison is 33 miles SSW, 2000' lower, and screened by 11000' mountains. There was a waxing moon when I was there, so I can't be positive, but I'd be surprised if there's much trace of any of 'em.

"Dinner Station" is a Forest Service campground, which mostly requires a reservation. The "Potholes" sites are open--"wild"--camping: BYO-Everything. There are many other wild camp sites along this valley, and several would be excellent astronomy sites.

At almost 9800' elevation, Taylor Park gets cold fast after nightfall. And see the mosquito discussion above; I'm sure you are seen as just a big bag of blood during their season. In mid-September last year (my only visit to date) there were none at all. Elk were bugling, the aspens were golden, and the first frost was just over the horizon.

Anyway, I hope to see you soon under the cosmic canopy!

--Tim Antonsen

From Allen Jeter: Largish Explosion on the Sun

Pretty interesting and cool video

http://blogs.discovermagazine.com/badastronomy/2011/06/07/the-sun-lets-loose-a-huge-explosion/

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Allen Jeter
Lumensa LLC
www.lumensa.com
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Best Looks

Moon	By Mercury July 2; by Saturn July 7 By Jupiter July 23; by Mars July 27
Mercury	Low in W at sunset first 3 weeks
Venus	Bright in dawn ENE start of month
Mars	In ENE predawn
Jupiter	In E predawn
Saturn	In SW in evening. By Gamma Virginis
Uranus	Predawn in Pisces
Neptune	Predawn in Aquarius
Pluto	Opposition June 28 in Sagittarius

Iridium Flares for Lemay and Trilby, Fort Collins July 2011

Date	Local Time	Mag	Alt.	Azimuth	Distance to flare centre	Intensity at flare centre (Mag.)	Sat
07 Jul	22:37:45	-7	35°	55° (NE)	7.7 km (W)	-8	Iridium 46
08 Jul	02:30:09	-6	17°	306° (NW)	2.6 km (W)	-6	Iridium 59
08 Jul	20:53:01	-3	68°	79° (E)	13.3 km (E)	-9	Iridium 14
08 Jul	22:31:48	-5	36°	57° (ENE)	10.4 km (E)	-8	Iridium 49
09 Jul	02:23:58	-0	17°	308° (NW)	78.4 km (E)	-6	Iridium 95
10 Jul	02:26:28	-6	12°	312° (NW)	18.5 km (W)	-6	Iridium 32
10 Jul	03:47:14	-3	46°	277° (W)	21.8 km (W)	-8	Iridium 35
10 Jul	20:45:08	-1	73°	82° (E)	23.7 km (W)	-9	Iridium 14
11 Jul	02:11:35	-1	14°	310° (NW)	69.5 km (E)	-6	Iridium 96
11 Jul	02:20:22	-0	13°	313° (NW)	81.8 km (E)	-6	Iridium 58
11 Jul	03:41:09	-2	47°	278° (W)	26.4 km (E)	-8	Iridium 6
11 Jul	05:26:54	-1	71°	237° (WSW)	26.2 km (W)	-9	Iridium 54
12 Jul	03:35:02	-0	46°	279° (W)	50.3 km (E)	-8	Iridium 4
12 Jul	05:20:50	-4	71°	239° (WSW)	10.9 km (W)	-9	Iridium 83
12 Jul	22:17:04	-3	43°	61° (ENE)	19.9 km (W)	-8	Iridium 3
13 Jul	22:11:02	-8	43°	63° (ENE)	4.3 km (E)	-8	Iridium 76
14 Jul	03:31:58	-2	40°	281° (W)	34.4 km (W)	-8	Iridium 5

Iridium flares link:

http://www.heavens-above.com/iridium.asp?Dur=7&lat=40.4999428&lng=-105.0573654&loc=Fort+Collins&alt=1525&tz=MST

STS mission will alter the ISS orbit so current elements are needed.

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