

The Objective View

Newsletter of the Northern Colorado Astronomical Society

April 2012

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Next Meeting: April 5 7:30 pm

Virgo Walkabout

By Tom Fay, Hewlett-Packard

Club Business at 7:15 pm

Coors Room, McKee Conference Center 2000 N Boise Ave, Loveland CO

Enter campus at 19th and Boise. Drive to Wellness Center Parking north of the buildings. Enter Wellness Center at its NW corner and proceed straight to the Coors Room.

NCAS Programs at McKee Conference Center

May 3	Dr. Dan Durda	Suborbital Space Missions
June 7	Randy Cunningham	Observing Tips, Filters
July 5	Ray Warren	Messenger Mission to Mercury
Aug 2	Daniel Greenridge	Bioblitz Dark Sky Volunteering

City of Fort Collins Natural Area Program

Fossil Creek Reservoir	830 pm	Apr 28
	9 pm	May 25

Bobcat Ridge Nat Area	830 pm	Apr 13
	830 pm	May 24
	930 pm	Jun 9

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

Dark Site Observing Dates

April 20, 21: Keota or other site, ask FRAC newsgroup

Other Events

Chamberlin Observatory Open House, 7 to 10 pm

Apr 28, May 26, Jun 23, Jul 28

303 871 5172 <http://www.du.edu/~rstencil/Chamberlin/>

Cheyenne Astronomical Society 7 pm April 20

<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 EVAS meeting,

7 pm April 26 TBA <http://www.angelsabove.org/>

Little Thompson Observatory, Berthoud 7 pm April 20

<http://www.starkids.org>

Longmont Astronomical Society 7 pm April 19 TBA

President's Room, Dickens Tavern, 300 Main St

<http://www.longmontastro.org/>

March 1 Program: Astronomy from Space: Where Have We Been? Where Are We Headed? By Dr. Paul Lightsey, Ball Aerospace

Astronomy is the study of objects in the sky well beyond the Earth. Astrophysics consists of interpreting the positions of the objects and the nature of the light that we gather from those objects to understand what and where they are. We are 8 light-minutes from our Sun. It is one of 100 billion stars in the Milky Way galaxy. We are about midway from the center to the edge of the galaxy which is 100,000 light-years across. Early peoples used their eyes and mechanical devices to measure positions of celestial objects. The astrolabe is handheld, Stonehenge and Anasazi sites are massive examples of ancient observatories. The quadrant was refined over time. Tycho Brahe had a large mural quadrant and built an Equatorial Armillary. He could measure planet positions to better than arcminute accuracy, and the precision in his data allowed Kepler to solve the Copernican "Mars Catastrophe." By fitting an elliptical orbit to Mars, accurate predictions could be made. Galileo introduced the telescope, which further improved the angular precision and revealed objects too dim to see with the eye alone. The all reflecting telescope of Isaac Newton permitted scaling to large apertures and coverage of a broad spectrum without chromatic aberration. Lyman Spitzer advocated space observatories in 1946. The atmosphere is opaque in UV and parts of the IR spectrum. Optical turbulence limits the diffraction limited performance (current adaptive optics can be applied to very limited fields of view). Fainter objects can be seen, because the background in space is 4 to 6 orders of magnitude less. The sensitivity of

systems has increased progressively since Galileo's 10 fold improvement in the 1600s. Herschel's 48 inch telescope gave about a 10,000x increase. The 100 inch and 200 inch telescopes with photography hit 100,000x, and larger scopes with CCDs reached 1 million fold. HST has achieved a 10 to 100 million fold increase. The JWST is projected to hit a 10e10 fold sensitivity over the eye. What do we mean by a Space Telescope? The HST is in low-Earth orbit. Its targets are compromised by the looming Earth, and IR background is increased due to Solar heating and the Earth. Getting the telescope into space is as important as the telescope. Thousands of launches occurred between the development of the V2, and the HST launch on the Space Shuttle. NASA's Great Observatories program covered the spectrum. Ball Aerospace was heavily involved in each. They were, the Compton Gamma Ray Observatory, the Chandra Advanced X-ray Astrophysics facility, HST for UV-VIS-IR, and the Spitzer Space Infrared Telescope Facility. HST has provided a versatile range of instrument and science since it's launch in April 1990. The first servicing mission in December 1993 included COSTAR with corrective optics for the precise but incorrectly figured primary mirror. The corrective optics proposed by Murk Bottema succeeded in delivering optical performance to a bit better than specified. Servicing flights occurred in 1997, 1999, 2002, and 2009. The 2nd generation STIS documented the massive black hole in M84's nucleus. Data indicated a velocity of 400 km/s within 26 l-y of the nucleus, consistent with a black hole of 300 million solar masses. The 2nd generation NICMOS penetrated the dust and gas in the Orion nebula to show new star formation. HST revealed distant Type 1a supernova, and relatively close Cepheid variables. These are standard candles in estimating the distance to galaxies. We can then understand the expansion rate and age of the Universe. There is a rich history of doing IR astronomy in space, dating from the survey by IRAS in 1983. ISO in 1985 looked at 60-200 micrometer wavelengths. Spitzer in 2003 covered 3 to 180 micrometer wavelengths. Herschel in 2009 added a 3.5 meter telescope, and 60 to 670 micrometers band. WISE in 2009 covers 3 to 25 um. The next mission needs to detect extremely faint IR sources. The James Webb Space Telescope will have over 25 square meters collecting area. Spectral coverage is 0.6 to 29 um. Telescope transmission is over 88% at 2 um and longer wavelengths. NIR goal is to be limited by natural zodiacal light background. It is to be at the technology limits for detectors and craft stray light emission. Telescope and instruments will operate at cryogenic temperatures, away from Earth at L2. The telescope will be aligned and phased by wavefront sensing and control. It is oriented to passively achieve cryo temperatures. The observatory is oriented to shade the payload at all times. The orbit allows access to the full sky over the year. L2 is at a saddle point, which reduces station keeping fuel and mass. JWST markedly expands on previous capabilities. Resolution will be about double HST. Field is about the same as HST and about 1/2 of Spitzer. Temp of 40 K brackets over half of HST's wavelength coverage and 2/3 of Spitzer's. Instruments on the craft are NIRCam, NIRSpc, MIRI, and from Canada FGS/NIRISS. It will explore the gap between the distant microwave background

and the nearer universe accessible to today's observatories. JWST will see through dust to probe galaxy and planet formation. Cosmology has progressed from the 1920s Edwin Hubble discovery that redshift increased with distance. The CMB has been detected and mapped. HST has pushed the limit of galaxy detection to $Z=7$, more recently $Z=10$. The next step will depend on JWST. It will also be applied to seek the origins of life. The primary, secondary and tertiary optics are completed. The support structures and spacecraft integration are the next hurdles.

Owl Flats, Pawnee Natl Grasslands, Observing March 23-24 2012

From Dan Laszlo: I was likely the last to roll in. Thanks to Rob Grover's detailed mileage to PNG road 609, and Bill's directions as darkness rolled in. Bill graciously shared his scope to try binoviewing the sliver crescent Moon, Jupiter, the Trapezium. Seeing was not allowing much over 120x on Jupiter, enough for some large scale belt texture, nothing more. had Sirius boiling so the Pup eluded us. Rigel's companion was easy as usual. The Orion Nebula got us into low power mode, and we enjoyed M35+NGC2158, M37, 38, 36. Bill could fit M44 at the lowest power, and he had to crank up a Nagler Zoom to complete the split Zeta 1 A and Zeta 1 B of multiple Zeta Cancri. Phi Cancri is good if you like matched binaries. The Double Cluster was sparkling in spite of thin clouds. I had found a used 41mm Panoptic this month, and that was great in Bill's scope framing the Rosette with his O III filter, and M81 spiral arm region and the mottling in M82. The Medusa Nebula was dim but distinct. We went after the "elusive supernova remnant IC 444." Bill was not able to reconcile the Sky Safari description of an 8 arcmin object with the view with more diffuse nebulosity. Sorry! My notes were in error, the target should have been the adjacent IC 443.

Early evening was mining the edge of the clouds. When clearing set in I set up my 18 dob. Mars never settled down to see anything on the surface but a hint of the North Polar Cap, it had been better at our Poudre Learning Center event. We revisited the SN in M95, the Leo Triplet, M81, 82, 101, 51, NGC 4565, M104. In my scope the views trended better over the night and after midnight the clouds were much less visible. M51 and M104 were surprisingly good. M101 and NGC 4565, the Leo galaxies, not as striking. We mostly resisted the temptation to get our retinas bleached, but Paul Robinson was cranking out DSLR frames with his Hyperstar and we had to see his Horsehead Neb and Comet Garradd shots. What a comet, distinct in binoculars, finely dissected in Bills scope and overflowing the field in the Dob. Last few objects before shutting down were a taste of M13, a crystalline M3, and NGC 3242 Ghost of Jupiter in Hydra. It allowed a bit of power to bring out the shells. In the end I was doing a fan blast on the mirror to salvage a Saturn view. I had to laugh at it from PLC last week, never had seen it flap its rings before. Sat morning was another story after 1 am, some truly sweet if fleeting views including some disk banding and the Cassini division.

CSU Shortgrass Steppe Lab Outreach March 23-24 from Rob Grover

Thanks, and kudos to Dave Dunn for scoping out the site.

Very well protected from the proliferation of lights on the plains, and aside from standard caveats about mud season in the spring (sorry Robert), access ought to work for about everyone.

From Bill Tschumy: No Messier Marathons but there were five of us at Owl Flats last night. Some clouds blew through early in the evening but there was always a chunk of sky to look at. By around 9PM it was totally clear until about 1 AM when I crawled in my tent.

The supernova in M95 was very obvious. Using SkySafari we could easily identify the field stars that should be there and the one 13th mag star just beyond the edge of the visible disk that shouldn't be. Bingo.

Seeing was marginal as usual but transparency was good. I got a 21.5 reading on the SQM corresponding to around 6.4 limiting magnitude. The light dome from Ft. Collins extended maybe 20 degrees up and was not much of an issue.

Lots of galaxies, two comets (Garradd and Gehrels), one supernova, some doubles, and the usual eye candy. Temps dropped to around 28° at one point.

All in all a splendid night of observing. Bill

From John F: Had a good night out at Owl Flats on Friday. I almost chickened out and didn't go based on the CSC prediction of heavy clouds till after midnight. But eyeballs work well too and as the afternoon wore on, the cloud bank to the NE began to recede. This hesitation caused me to leave late, but I got there just after sunset and with the early evening clouds I had plenty of time to set up and get organized.

My observing routine is to concentrate on one or two sectors of the sky and hunt down as many galaxies as I can. Last night was Southern Leo and Coma Berenices. I didn't push it and only logged 25 galaxies and one globular (NGC 4147). The highlight of the evening was the Hickson 61 group of four galaxies that form a box. Three of them are "flat" (edge on), one is elliptical. These are small and range in brightness from 12.2 - 13.4 according to Sue French in Deep Sky Wonders. Even being well placed in the sky and reasonably dark by late evening, 3 of the 4 could be seen steadily while the last (4173) was barely a ghost. Still, with patience and magnification all four could be coaxed out of my 12.5 inch scope.

There were no winds (what a gift for this time of year), moderate temps (though it was below freezing after midnight) and it seemed as if the humidity was up since even though it was dark and "clear", stars were "soft" and low surface brightness galaxies were particularly difficult.

Still a great night for early in the season.

John F.

A fantastic outreach @ the CSU Shortgrass Steppe Research Center Friday night. Lots of telescopes, few guests and mostly excellent skies.

Greg H., Tim A., David A., Jolene P., Charlie D., Jon C., Mike F., and I all enjoyed the evening. Good views of the thin crescent, Venus, Jupiter & Mars as twilight waned. Then to the eye candy for the guests. Keeping an ear tuned to what the bigger scopes were showing, I trained the ES102 toward the Pleiades & the M42 region for some stunning wide-field views, allowing our visitors to see things in a broader context. Comet Garradd was great as well. Let Saturn get some elevation and could put some decent power on it. Seeing allowed fleeting glimpses of the Cassini Division in my small scope. Also spent time cruising the Leo / Coma / Virgo region, nabbing some fine galaxy views. Guests actually stayed fairly late, with the last stragglers leaving around midnight. We had a batch of clouds come over, lasting around an hour – but there were some sucker holes & we could usually find something to show.

I attached the camera to the scope and got about 2.5 hours worth of M13 images. Looked them over today and it appears I had some breeze issues. Fairly well protected by the lodge building, but the occasional gust got me. Still, over a half of them are really nice looking. Will get to processing them later today or tomorrow.

Particular viewing highlights I recall are M104, the Leo Triplet, Markarian's Chain, NGC 4565, M3, M13, M46, M92, M4, M11, M22, M8, M20, M57, NGC6888 and the Veil. Nice to see the Summer Milky Way rising again. Packed up in the morning twilight and left right at sunrise.

Thanks to the volunteers for allowing me to mooch some photons, CSU for use of the facilities and Mark Lindquist for helping us get situated, taking care of the lodge lights and showing us around the lodge. Nice to have facilities and a place to warm up.

Skies similar to Owl Flats, but the light dome is more SSW. Tail of Scorpius washed out as it rose. Some white lights to the N, combined with a couple cell towers flashing and some wind turbines with their red flashing lights. Not too bad, but still a bit of a distraction. Lodge building obscures some of the NNW but served as a good windblock. Temps stayed warm. With the objects we were viewing late and the warm air, it felt more like May than March. While packing up, Greg said it was still 47F! Think it dropped into the low 40s or even high 30s for a short time. My hands felt a bit cool once around 2:30 – 3:00AM.

Will decide around 4:30 if I have another night of observing in me. The all-nighter last night was fun, but I didn't get a ton of sleep today.

Robert

From Rob Grover: Venus Setting Time Lapse

Hi All –

I finally figured out how to upload an HD version of the Venus Setting time lapse video to You Tube.

When the video opens up, you can change the resolution to 1080p (little wheel icon lower right of player) and go to full screen for optimum viewing.

<http://www.youtube.com/watch?v=hiQOc18vtSg&feature=g-upl&context=G2f6a9c5AUAAAAAAAAAAAA>

Enjoy!

And Fossil Creek Outreach March 30

Another fine outreach event Friday, March 30, 2012. Greg H., Charlie D., Tim A., Jon C., Mike F., Bob G., Dan L. and I managed to dodge clouds and show our 64 guests some good views of the Moon, Jupiter, Venus, Mars, Saturn, and even some of the brighter deep sky objects managed to burn through the haze. Decent views of M3 & M45 in my refractor, but I spent most of the evening trained on the Moon in general, and Plato, the Montes Alpes, Vallis Alpes & Montes Caucasus in particular. These were in particularly good position for some amazing views @ 150x. Seeing had some fine moments, but deteriorated later in the evening – 10:30 or so.

After most guests left, Dan shared his binoviewer with several of us. Very crispy lunar views through Mike's large refractor, Tim's 6" refractor and my 4" as well. There's just something special about the way things look using both eyes. Also had some fine wide field lunar views with a 41mm Panoptic and a 31mm Nagler. Thanks for the treats, Dan!

Even though we had some cloud cover and high haze, the telescopic views pleased everyone. Venus looked pretty good, with a bit less than 50% illuminated. High enough that it isn't the typical boiling blob I've become accustomed to seeing when I point my scope that direction. Jupiter is getting a little low to give great views, but still looked decent. Tim & Greg said Mars showed some surface details, though I didn't get a

look at that target. Saturn showed the rings OK, but the seeing never cooperated for me. Others may have had better luck on it than I did.

Amazingly warm night for late March. I put on a heavy shirt & sweatshirt soon after sunset & never needed any more insulation. Packed up a little after midnight. As I left the parking lot, I checked the temperature on my car's thermometer & it read 51F. More like May or June.

Thanks to all the volunteers!

From Robert Arn: Venus and The Sisters

Well, I was hoping to release this image as part of a series which showed Venus as it slid pass the Pleiades. However overcast skies tonight (and tomorrow night) have nixed that plan. So here is Venus/M45 from last night:

<http://www.astroarn.com/solarsystem/h312a0e83#h312a0e83>

Milky Way Rising

Looks like it is about time for summer - and I am not just talking about the warm temps. The summer Milky Way is back up and posing for some spectacular shots. I took this one from a trail leading to the Pawnee Buttes around 4-5 in the morning.

<http://www.astroarn.com/nightscape/h239bca4c#h239bca4c>

Lyrid Meteor Maximum April 22

Best Looks

Moon By Mars Apr 4, 30; by Saturn and Spica Apr 7;
By Jupiter Apr 22; by Venus Apr 24
Mercury Difficult low in E at sunrise
Venus By Pleiades Apr 2 to 4
Greatest Brilliancy end of month – 4.7, bright in dusk sky
Mars Opposition Mar 3. Highest middle of the night
Jupiter In W early in evening.
Saturn Opposition Apr 15. In S middle of night



March 30 2012 Fossil Creek Reservoir Starwatch, by Charlie Davis

International Space Station Passes for Loveland – Fort Collins

April 2012

Check passes after April 5, ISS is to be boosted

Date	Mag	Starts			Max. <u>Altitude</u>			Ends		
		Time	<u>Alt.</u>	<u>Az.</u>	Time	<u>Alt.</u>	<u>Az.</u>	Time	<u>Alt.</u>	<u>Az.</u>
05 Apr	-0.7	04:08:05	19°	NNE	04:08:05	19°	NNE	04:10:14	10°	ENE
05 Apr	-3.5	05:41:08	10°	NW	05:44:21	81°	SW	05:47:31	10°	SE

ISS predictions can be obtained from:

<http://www.heavens-above.com/?Lat=40.48322&Lng=-105.01522&Alt=1500&Loc=Fossil+Creek+Reservoir&TZ=MST>