

# The Objective View

Newsletter of the Northern Colorado Astronomical Society

November 2004

Dan Laszlo, President and Newsletter Editor  
[djlaszlo@aol.com](mailto:djlaszlo@aol.com) office 970 498 9226  
Max Moe, Vice President  
[Maxwell.Moe@colorado.edu](mailto:Maxwell.Moe@colorado.edu)  
Kimon Berlin, Secretary  
[kimon@deepskymarines.org](mailto:kimon@deepskymarines.org) 970 267 9908  
Nate Perkins, Treasurer  
[tracyperkins@earthlink.net](mailto:tracyperkins@earthlink.net)  
David Chamness, AL Correspondent  
[dec@frii.com](mailto:dec@frii.com) 970 482 1794  
Tom Teters, Web Site Editor  
[tomt@starmon.com](mailto:tomt@starmon.com) 970 482 5702

Open House, Chamberlain Observatory, dusk to 10 pm  
Nov 20 Dec 18 303 871 5172  
<http://www.du.edu/~rstencil/Chamberlin/>

Longmont Astronomical Society  
Nov 18 7 pm Longmont Christian School, 550 Coffman St  
<http://longmontastro.org/>

**Next Meeting: November 4 7:30 PM**  
**Show and Tell Meeting, NCAS Members**

**NCAS Business at 7 PM**  
**Meeting directions Discovery Science Center**  
**703 East Prospect Rd, Fort Collins**  
<http://www.dcsm.org/index.html>

In Fort Collins, from the intersection of College Ave and Prospect Rd, head East about 1/2 mile. See the Discovery Center sign to the South. Enter the West Wing at the NE corner. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Center on the left.

**NCAS Dark Sky Star Party Dates**  
**November 5, 6, 12, 13**

Cactus Flats site is on undeveloped parcel of prairie about 6 miles West of Briggsdale. Take Colo Hwy 14 East from I-25 (Exit 269). Go 19 miles East to Ault. Continue 18 miles East of Ault. At County Rd 65 (Milepost 170), turn North, go one mile. Site is through the wire gate on the right, no road, close gate and set up. Beware of the cactus. The site is now officially wheelchair accessible, but there are no facilities so bring essentials. Call **Tom Teters**, [tomt@starmon.com](mailto:tomt@starmon.com), with questions about star party status or dates, 482-5702.

**Starwatch at Discovery Science Center**  
703 E Prospect Ave, Fort Collins  
October 22 6:30 pm  
October 27 total lunar eclipse, dusk  
November 19 6:30 pm  
January 14 6:30 pm

## Other Events

Little Thompson Observatory Star Night, Berthoud  
November 19 Star Night  
<http://www.starkids.org>

Cheyenne Astronomical Society  
November 19 7 pm Cheyenne Botanical Garden  
<http://home.bresnan.net/~curran/>

## October 7 Program

### Quasar Outflows and their Role in Structure Formation in the Universe

**Dr. Nahum Arav, University of Colorado**

Dr. Arav's interest in the sky was kindled as a teenager in Israel. He avidly watched meteors and deep sky objects. He pursued a Ph.D. at CU Boulder in 1994, and has come under the curse of Chief Niwot, destined to return to Colorado. A Hubble Ultra Deep Field image shows galaxies to 30<sup>th</sup> magnitude. This allows us a glimpse of the early stages of the Universe. Cosmologists can now model the development of its structure. They work in a model cube that is 64 or 128 megaparsecs on a side. They start with the time of objects with a redshift  $Z=28.62$ . The model starts with little perturbations, and when gas dynamics do their work, the current filament structure in galaxy distribution is formed. Thanks to WMAP, the age of the Universe is constrained to 13.8 +/- 0.2 billion years. Several weeks of supercomputer time confirm that the model is a reasonable match to observations. But enigmas remain. Galaxies should continue to grow with time. For the past 8 billion years, galaxies do not grow larger. Gas in galaxy clusters also does not behave as predicted. It was expected to migrate to the cluster center, then become dense and then rapidly drop in temperature. But, X-ray images from Chandra do not confirm the cooling flows.

Arav is using quasars as tools to explore these problems. Quasars were first found as starlike objects with strong radio emission. The first optical spectra were had mysterious lines in the visible which directly matched no elements on Earth. Then Maarten Schmidt came running out of his office screaming, "I know what the lines are!" They were the Balmer series of H lines, but they suffered extreme redshift. The correlation of redshift with distance is the cornerstone of the scale of the Universe. Changes in quasar emission can last less than an hour. Therefore, the scale of these objects, which overpower galaxies by 100x, could be at most a few light hours across. If a quasar were a football stadium, its light would be outshining the rest of the US. Immediately, supermassive black holes were postulated in quasars. Stars can at best convert 0.5 percent of their rest mass into energy. A black hole taps into gravitational energy, and can put out 10 to 30 percent of its rest mass as energy. Quasar 3C 175 has a jet which extends about a megaparsec. Radio emission is high at its core and ends of lobes. Energy from the jet is small by comparison. We can thank the Japanese for their \$400,000,000 investment in the Subaru Telescope. They spared no expense, and it performs beautifully. An image of NGC4388 combines O III, visual, and H alpha wavelengths.

It shows a pattern of slow outflow from the galaxy, extending several kiloparsecs. This addresses the question of galaxy growth. We believe that each spiral galaxy houses a supermassive black hole, with a million to a billion solar masses. We observe a quasar when the black hole is feeding, matter is falling in. The Milky Way is now has a dormant black hole. Reinhardt Genzel has direct evidence for a black hole of 3 million solar masses at the Milky Way's center. A star orbiting the center reaches a speed of 1500 km/sec. A nonluminous central object with the necessary mass must be a black hole. Tidal disruption of stars orbiting the center will lead to matter infall in tens of millions of years. We are developing a story of supermassive black hole origin. The early universe had hydrogen clouds that formed 150 solar-mass stars. These exploded to form supernovae of 10 solar masses. These accrete more mass, and can grow relatively quickly within 2 billion years. As galaxies form, black holes migrate to the center. M82 is in a massive starburst phase. Outflow is driven by supernovae in the center, blasting out. Five years ago Arav used 40 orbits with HST to get a UV spectrum of a quasar. The Carbon 4 line shows an absorption trough, indicating strong winds. The blue shift indicates winds up to 15,000 km/sec. He is looking for evidence that the winds are affecting their surroundings. To recap, he wishes to determine how the size of galaxies is determined. He would also like to know why cooling flows are not seen in galaxy clusters. He has hypothesized that outflow from galaxies combats their growth, and that the outflow heats the surroundings. This keeps the cooling flow from developing. Scrutiny of several spectral lines allows an estimate of the magnitude of galaxy outflow. Cosmologists can use this as a reality check on their models. On the brink of addressing the question with HST, political upheaval has intervened. A revolution in knowledge has occurred in the past 15-20 years. The next step is threatened by funding priorities which will starve science, in favor of schemes to put people in space, trips to the Moon and Mars. The cancellation of the HST repair mission has put UV research on hold. Arav has adapted by evaluating large outflows, looking at lines which are redshifted into the visible, using Earth-based telescopes like the Keck Observatory. NGC985 is a recent target for measurement of outflows. It is necessary to reconcile several absorption lines. Correction for the amount of neutral H has been necessary. He is optimistic that the optical data will be reconciled with X-ray data from Chandra. He then showed an animation of a galaxy in a steady state, with inflow balanced by outflow. The big quasar era was 10 billion years ago. To revive a quasar, merger of 2 big galaxies will suffice. In a quasar, the outflow overwhelms the binding energy. The jet from a quasar is too small to contribute to outflow, but it may impact heating. Max Moe is working with Arav's group on measurement of outflows.

#### **NCAS Business, October 7 2004**

President Dan Laszlo called the meeting to order. The treasurer's report was given by Nate Perkins. Dave Chamness invited volunteers for a public starwatch at Pawnee National Grasslands. Dan Laszlo announced Fall dates for Discovery

Science Center starwatching. Gerry Reynolds observed a recent large amateur rocket launch. Tom Teters received astronomy outreach material from NASA.

From Gary G

#### **Star Party at Crow Valley Campground October 9**

Hello all. We went to Crow Valley in Pawnee grasslands this weekend for Star Party. Tom T, Steve L, Dave D, Dan (new LAS guy), Dave C. and his wife and several others for a very good night under ideal conditions, Clear transparent skies, not too bad seeing conditions. They all were blown away with views in 30, 18, and 16, 14, 9.25 inch and 8 inch scopes. Huge group of two bus loads of people, guest speaker from university and Park Ranger. I was hoping to get to use this area in winter months but they lock gates to keep hobos out during winter months. Maybe we can get permission to use site that is more out of the wind than Cactus Flats north. The reason we do not use it other times is of course all the people with lights and campfires. We use the very far end so just a few people to come and go. Last night we entertained some campers also who loved it too, most never saw views thru scopes.

I looked at many objects, NGC 253, NGC 891, edge on galaxies. We also found NGC 6946 and the super nova going on in it. We stayed up till 2:30 am for views of Orion, first telescope view since last year, and the queen of the universe, the majestic Saturn and its tiny moons.

The Greeley newspaper was there for write up in paper this week. Always an adventure, glad to see my astro friends again as usual, the Dark Sky Marines from LAS and NCAS. See you in the Dark, bye, aperturemon

From Mike P

#### **Observing from Estes Park October 9**

regarding SN 2004et in NGC6946 (Caldwell 12) in Cepheus. I observed this spectacular supernova as well as the fading SN 2004dj in NGC 2403 (Caldwell 7) in Camelopardalis on both 10/8/94 and 10/9/94 using my C14 from my back porch in Estes Park. On both nights the seeing was excellent (4 on a 1-5 scale) and the transparency was average (3 on a 1-5 scale). 6th magnitude stars were easily seen naked eye. SN 2004et in NGC 6946 was a bright stellar object (being about 12<sup>th</sup> magnitude) in the center of a long isosceles triangle of 12<sup>th</sup> to 13<sup>th</sup> magnitude foreground stars which lie just beyond the visible end of the outermost spiral arm east and slightly south of the galactic nucleus (I printed out the picture of this SN from the web site). In Stephen J. O'Meara's book "Deep Sky Companions - The Caldwell Objects" he states that NGC 6946 has a puzzling propensity for Supernova explosions including 6 supernovae in the 20th century (in 1917, 1939, 1948, 1968, 1969 and 1980). He goes on to say that NGC 6946 is about due for another Supernova (as of his writing in 2002). He was right and this one is a beauty! By the way, NGC 6946 is a gorgeous spiral (and well-placed this time of year) with three spiral arms easily visible in the C14 (a fourth was suspected) including several H II regions or stellar associations (bright clumps). NGC 2403 in

Camelopardalis is also a nice spiral though poorly placed this time of year (I observed it at 2 AM and it was still fairly low in the NE), but the fading SN 2004dj was still easy at between 12-13th magnitude at the edge of the visible disk of the spiral, east of the nucleus. I also observed about 2 dozen planetary nebulae (about a quarter of which were IC objects), about a dozen galaxies, 2 dozen open clusters, and about a dozen globulars on these two nights, and was regularly using my 9 mm Nagler (434x) on the planetaries and globulars as the seeing was so excellent (rare for Estes Park). Overall a spectacular weekend of observing (Friday I got dewed/frosted-out at about 3:30 AM and on Saturday I was dead tired by 2:30 AM when the seeing was also starting to degenerate). I hope you have been getting in some good observing also. Clear Skies!- Mike P

### Lunar Eclipse Night at Discovery Center

Thank you SO MUCH to you and to the rest of your group for all the wonderful telescope viewings of the lunar eclipse! It was great to have all of you there to help others witness that incredible event up close. I'm so glad the clouds cleared enough for us to view it! I have heard many great comments about the evening, and you were a big part of that. Thanks for your ongoing dedication and commitment to the programs and outreach of the Discovery Science Center. Please pass on our thanks to those who were there. You are all WONDERFUL! Deborah P

### Binoculars for Sale

11x80 binoculars in excellent condition, with caps and case. \$145. Contact [REScline@aol.com](mailto:REScline@aol.com)

### Scope for Sale

I put my telescope "up for auction" on Ebay last night and would gladly show it to anyone in the Northern Colorado area that may be interested.

Dear rgfitz,

Your item has been successfully listed on eBay. It may take up to several hours for your listing to appear in eBay search results.

Listing details

Item name: JSO-12B 5" SCT with Mizar equatorial mount

Subtitle: Designed for Eyepiece Projection Photography

Item number: 3849527161

Listing format: Auction with Buy It Now

Main category: Cameras & Photo:Binoculars &

Telescopes:Telescopes:Schmidt-Cassegrain

Quantity: 1

Start price: \$500.00

Buy It Now price: \$1,000.00 Buy It Now

Listing duration: 7 days

Start date: Oct-29-04 21:09:23 PDT

End date: Nov-05-04 20:09:23 PST Richard FITZGERRELL

3820-G Colorado Ave

Boulder

303-442-8959

[rgfitz@earthlink.net](mailto:rgfitz@earthlink.net)

### URL for Clear Sky Clocks for Colorado

[http://cleardarksky.com/csk/prov/Colorado\\_clocks.shtml](http://cleardarksky.com/csk/prov/Colorado_clocks.shtml)

### Best Looks

Moon	By Saturn 11/3 and 11/30 By Jupiter 11/9 By Venus 11/10 By Mars 11/11
Mercury	Very low in SW at dusk last 2 weeks
Venus	Bright in E predawn By Jupiter 11/ 4 and 5 By Spica 11/17
Mars	Low in ESE at dawn, by Spica 1 <sup>st</sup> week
Jupiter	Low in E predawn
Saturn	High in E predawn
Uranus	In Aquarius late evening
Neptune	In Capricornus late evening

### Leonid meteors November 17

Expect at most 15 per hour, in predawn hours.

From: Dan Laszlo  
2001 S Shields St Building H  
Fort Collins CO 80526

**TO:**

## International Space Station Passes for Loveland – Fort Collins

November 2004

Date	Mag	Starts Time	Alt.	Az.	Max. Altitude Time	Alt.	Az.	Ends Time	Alt.	Az.
03 Nov	2.7	04:04:01	12	E	04:04:01	12	E	04:04:22	10	ESE
03 Nov	0.9	05:35:45	17	WSW	05:36:48	20	SW	05:39:08	10	S
04 Nov	1.7	04:31:54	19	SE	04:31:54	19	SE	04:32:53	10	SE
05 Nov	2.0	04:59:49	11	S	04:59:49	11	S	04:59:59	10	S
09 Nov	2.1	18:30:53	10	S	18:30:53	10	S	18:30:53	10	S
10 Nov	2.2	18:57:45	10	SW	18:58:18	14	SW	18:58:18	14	SW
11 Nov	0.8	17:50:55	10	S	17:53:16	22	SE	17:53:49	20	ESE
12 Nov	-1.0	18:17:55	10	SW	18:20:52	85	SE	18:20:53	84	SE
13 Nov	0.6	17:10:45	10	SSW	17:13:16	26	SE	17:15:50	10	ENE
13 Nov	1.4	18:45:59	10	W	18:47:46	25	WNW	18:47:46	25	WNW
14 Nov	-0.7	17:37:50	10	WSW	17:40:41	77	WNW	17:42:51	18	NE
15 Nov	0.9	18:05:53	10	W	18:08:27	26	NNW	18:09:27	22	N
16 Nov	1.9	18:34:34	10	NW	18:35:55	14	NNW	18:35:55	14	NNW
17 Nov	1.1	17:25:32	10	W	17:27:59	24	NNW	17:30:29	10	NNE
18 Nov	1.8	17:54:09	10	NW	17:55:43	13	NNW	17:56:53	11	N
20 Nov	1.8	17:13:27	10	NW	17:14:52	13	NNW	17:16:18	10	NNE
22 Nov	2.0	18:09:19	10	N	18:09:32	10	N	18:09:32	10	N
24 Nov	1.7	17:27:46	10	N	17:28:46	11	N	17:29:45	10	NNE
25 Nov	1.2	17:54:00	10	NNW	17:55:45	17	NNE	17:55:45	17	NNE
26 Nov	1.1	18:20:20	10	NW	18:21:44	22	NNW	18:21:44	22	NNW
27 Nov	1.0	17:12:03	10	NNW	17:14:12	18	NNE	17:16:11	11	ENE
27 Nov	1.9	18:46:53	10	WNW	18:47:49	18	WNW	18:47:49	18	WNW
28 Nov	-0.3	17:38:16	10	NW	17:41:04	40	NNE	17:42:24	24	E
29 Nov	-0.2	18:04:44	10	WNW	18:07:38	57	SW	18:08:51	30	SSE
30 Nov	-0.4	16:55:56	10	NW	16:58:48	45	NNE	17:01:38	10	ESE
30 Nov	2.2	18:31:59	10	W	18:33:53	16	SW	18:35:39	11	S
01 Dec	0.2	17:22:19	10	WNW	17:25:10	48	SW	17:28:02	10	SE

**CU-Boulder Researchers To Analyze Meteorite That Fell Outside Berthoud**

Oct. 11, 2004

University of Colorado at Boulder researchers will scientifically analyze a meteorite that fell outside Berthoud, Colo., last week, only the fifth to ever have been seen falling and subsequently recovered in Colorado, experts say.

The meteorite weighs more than 2 pounds and is about as large as a baseball, although it is irregular in shape. It appears to be made of igneous rock and is melted on its surface from the heat of entering the atmosphere. The meteorite probably broke off an asteroid or planetary body.

"Its igneous composition reveals that it was chipped off an asteroid large enough to undergo some form of volcanic activity," said Nick Schneider, associate professor of astrophysical and planetary sciences.

Megan and John Whiteis of Berthoud, and Megan's son, Casper, provided the meteorite to aerospace engineering sciences assistant professor Scott Palo for scientific analysis after they saw it land in their backyard. The couple had just walked out their back door into the yard at 1:30 p.m. on Oct. 5, when the meteorite flew over their heads and landed about 100 feet ahead of them.

Megan's mother, Marilyn Meador, contacted the National Center for Atmospheric Research and spoke with Dr. Maura Hagan who emailed Palo. Palo is an expert in radio meteors -- the study of ionized meteor trails in the upper atmosphere using radio waves. Palo spent the next few days putting together a team of scientists interested in helping to analyze the specimen.