



# THE STAR DIAGONAL

THE JOURNAL OF THE OGDEN ASTRONOMICAL SOCIETY



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## Meeting Announcement

Our monthly meeting of the Ogden Astronomical Society will be held on February 12, 2014 at 7:30pm at the Ott Planetarium.

## President's Message

Is it really February? I was checking my flower beds and the tulips are starting to come up already. With several clear nights lately I have seen more stars than you usually find this time of year and everything isn't frozen.

I set up my telescope and got some great views of Comet Lovejoy but I didn't do so well with Asteroid 2004 BL86. Viewing from my severely lighted polluted back yard is a challenge.

Our big event this month will be our annual trip to St George February 20th and 21st. We have a few locations that are good depending on wind and weather so we will pick a spot just before the star party. Dave will be going down Thursday the 19th

and check it out. Anyone planning to go should contact Dave Dunn or me so we can all get together. Everyone is taking care of their own accommodations; you can go cheap for around \$50.00 or more if you want something a little nicer.

We have our meeting this month Thursday the 12th at 7:30 the main topic will be a video on what is going on in Eta Carinae, hope to see you there.

Lee Priest

## OAS Minutes – January 2015

OAS Minutes January 8, 2015

Lee Priest opened the meeting at 7:30,

Announcements for upcoming star parties: St George Friday, February 20 and 21, some people are traveling on Thursday. Everyone is on their own for motel reservations. Observing location to be determined later.

Star party at Curlew on March 20 and 21, this is the best time to do a Messier Marathon for those that want to do it.

Another star party at Curlew will be April 17 and 18.

Several members reported seeing comet Lovejoy in binoculars over the past few nights.

Ron Vanderhule reports seeing a Fire Ball on Wednesday evening just before 10:00, no one else saw it.

The Show and Tell started with Dale Hooper showing his new deep sky video camera the MallinCam junior pro. Dale got the camera for Christmas and hasn't tried it out yet but he will let us know how it works. You can get more information about the camera at:

<http://www.mallincam.net/>

Dale also talked about the upcoming triple shadow transit of Jupiter on January 23, 24

Details can be found in the January issues of Astronomy and Sky and Tel

8:11 pm Callisto's shadow first touches Jupiter

9:35 pm Io's shadow first hits Jupiter

10:41 pm Io passes into Callisto's shadow - (eclipse of Io by Callisto)

10:59 pm Io's shadow leaves Callisto's shadow

11:27 pm Europa's shadow begins crossing Jupiter

All three shadows appear on Jupiter for the next 25 minutes. This won't happen again until 2032!

11:52 pm Io's shadow leaves Jupiter

01:00 am Callisto's shadow leaves Jupiter

02:22 am Europa's shadow leaves Jupiter

Dale also mentioned the near earth asteroid coming around January 26, details for that can be found in the February issue of Sky and Tel.

David Rady showed his new planetary camera the QHYCCD QHY 5-ii more information can be found at: <https://www.astrofactors.com/>

David has not used his camera yet ether; he will let us know how it works later.

David also talked about Auto Stack and other free software for astrophotography.

Stan Martin showed an online interactive program to teach night sky navigation and constellation identification. A link to it is:  
<http://shadowsnook.com/MAG/Stuff/NightSky/Pages/001.html>

Stan also showed a video from Obsession Telescopes on cleaning large aperture telescope mirrors. There was a discussion about other methods of cleaning mirrors.

Meeting was adjourned with several members going to Village Inn for more socializing.

Minutes taken by Lee Priest.

## Proposed Star Parties

### Public

- 4/25 – Antelope Island
- 5/16 – Antelope Island
- 6/20 – Antelope Island
- 8/8 – Antelope Island
- 9/10–9/13 – Great Basin Astronomy Festival
- 9/19 – Antelope Island
- 10/17 – Antelope Island

### Requested

### Private

- 2/19-2/22 – St. George
- 3/20-3/22 – Messier Marathon (Curlew)
- 4/17-4/19 – Curlew
- 6/11 – Annual BBQ at Doug's
- 7/17-7/19 – Monte Cristo (many arrive by Weds or Thurs)
- 8/14-8/16 – Monte Cristo
- 10/9-10/11 – Messier Marathon (Curlew)

## Minor mergers have massive consequences for black holes

By Dr. Ethan Siegel

When you think of our sun, the nearest star to our world, you think of an isolated entity, with more than four light years separating it from its next nearest neighbor. But it wasn't always so: billions of years ago, when our sun was first created, it very likely formed in concert with thousands of other stars, when a giant molecular cloud containing perhaps a million times the mass of our solar system collapsed. While the vast majority of stars that the universe forms—some ninety-five percent—are the mass of our sun or smaller, a rare but significant fraction are ultra-massive, containing tens or even hundreds of times the mass our star contains. When these stars run out of fuel in their cores, they explode in a fantastic Type II supernova, where the star's core collapses. In the most massive cases, this forms a black hole.

Over time, many generations of stars—and hence, many black holes—form, with the majority eventually migrating towards the centers of their host galaxies and merging together. Our own galaxy, the Milky Way, houses a supermassive black hole that weighs in at about four million solar masses, while our big sister, Andromeda, has one nearly twenty times as massive. But even relatively isolated galaxies didn't simply form from the monolithic collapse of an isolated clump of matter, but by hierarchical mergers of smaller galaxies over tremendous timescales. If galaxies with large amounts of stars all have black holes at their centers, then we should be able to see some fraction of Milky Way-sized galaxies with not just one, but *multiple* supermassive black holes at their center!

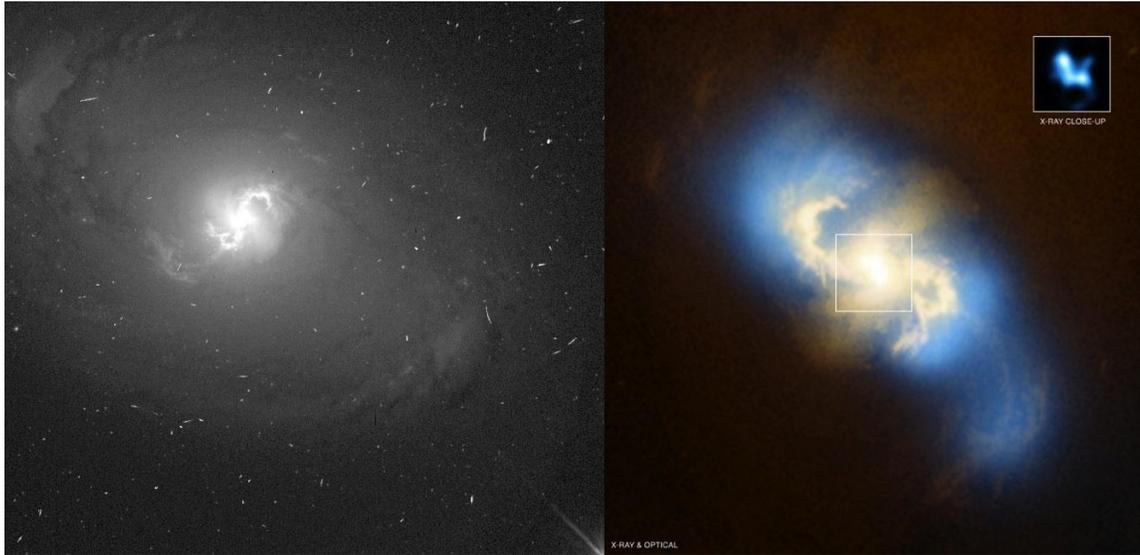
It was only in the early 2000s that NASA's Chandra X-ray Observatory was able to find the first binary supermassive black hole in a galaxy, and that was in an ultra-luminous galaxy with a double core. Many other examples were discovered since, but for a decade they were all in ultra-massive, active galaxies. That all changed in 2011, with the discovery of two active, massive black holes at the center of the regular spiral galaxy NGC 3393, a galaxy that must have undergone only minor mergers no less than a billion years ago, where the black hole pair is separated by only 490 light years! It's only in the cores of active, X-ray emitting galaxies that we can detect binary black holes like this. Examples like NGC 3393 and IC 4970 are not only confirming our picture of galaxy growth and formation, but are teaching us that supermassive relics from ancient, minor mergers might persist as standalone entities for longer than we ever thought!

*Check out some cool images and artist reconstructions of black holes from Chandra:*

<http://chandra.harvard.edu/photo/category/blackholes.html>

*Kids can learn all about Black Holes from this cool animation at NASA's Space Place:*

<http://spaceplace.nasa.gov/black-holes>.



*Images credit: NGC 3393 in the optical (L) by M. Malkan (UCLA), HST, NASA (L); NGC 3393 in the X-ray and optical (R), composite by NASA / CXC / SAO / G. Fabbiano et al. (X-ray) and NASA/STScI (optical).*

*Editors download photo here: <http://spaceplace.nasa.gov/review/partners/2015-01/ngc3393.jpg>*