

Newsletter of the Baton Rouge Astronomical Society



September, 2015

Next Meeting: Monday, Sept. 14th 7pm at HRPO



CALET arrives at the ISS. For more information, click on the image above.

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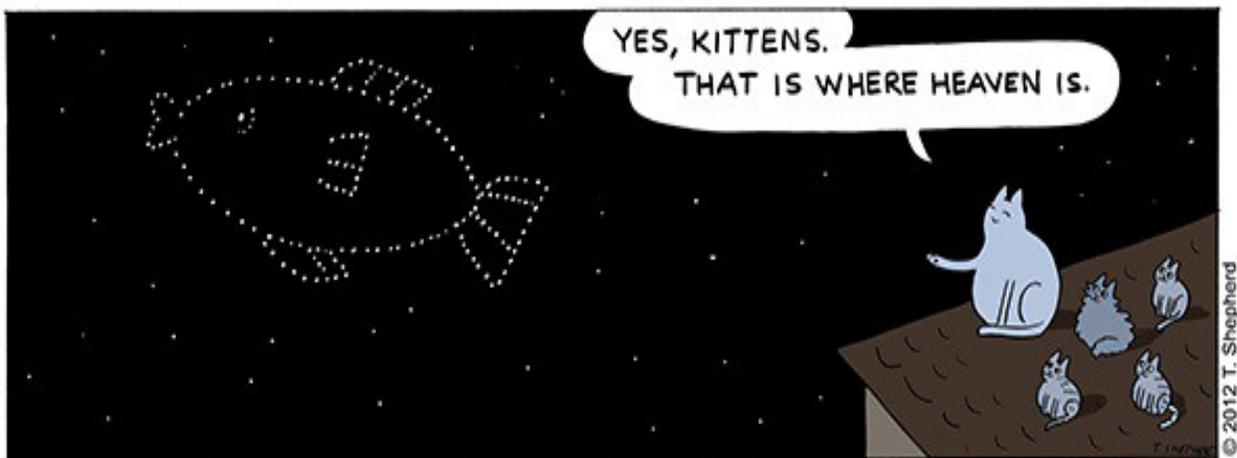
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President's Message

How do you like the cool, dry weather we received recently. I hope it is a sign of things to come as Autumn and the Deep South Regional Stargaze approaches. If El Nino holds, it might be a good year weather-wise.

Barry said the Feliciana Retreat Center raised their prices a bit (to keep up with ever increasing costs of expenses) but agreed to offer us the same rate as previous years. Although it will not affect us this year, I want you to be aware that it will be a factor in next year's event.

Brass is raffling an almost new 10" Orion SkyQuest Dobsonian Intelliscope. The Intelliscope features are being tested but even if they do not work, it is still a very fine scope. \$5 per ticket or five (5) for \$20.

BRAS received an invitation from the Main Street Theater in Houston for their premiere presentation of Silent Sky by Lauren Gunderson, November 1 – 29, Rice Village Theater.

<http://www.mainstreettheater.com/mainstage/silentsky.html>

According to the flyer, Silent Sky is:

“A new play about Henrietta Swan Leavitt and the real women “computers” working at Harvard Observatory at the dawn of modern astronomy. In this exquisite blend of science, history, family ties, and fragile love, a passionate young woman must map her own passage through a society unaccustomed to strong women in a man's world. A celestial romance and true story of discovery. Finalist for the Jane Chambers Award 2013. <http://silentskyplay.tumblr.com/>

“Lauren Gunderson's luminously beautiful play... A lovingly crafted period piece that imagines Leavitt's inner world against the backdrop of World War I, Einstein's discoveries and the suffragette movement, Silent Sky is an intellectual epic told on an intimate scale. Bottom line: Heavenly.”—Atlanta Journal-Constitution”

Not only would you get to enjoy a stage production but may learn some astronomical history as well. How about a road trip? “Group rates are available (\$27 per ticket if you have at least 10 people), and I'm also wondering if we might brainstorm about other collaborations with your astronomical society and our production.”

As always, if you have a topic you would like to present for a future BRAS meeting activity, let me know.

Clear skies,
Merrill Hess

Magnetically Levitating Black Holes

Lurking in the centers of most galaxies, including our own Milky Way, are supermassive black holes: monsters from several hundred thousand to several billion solar masses jammed into a volume equivalent to that of our solar system. Gas or stars drifting too close will find themselves caught in the grip of the powerful gravitational field, trapped in an inexorable death spiral ever faster and tighter down toward the black hole, until voraciously consumed in a last gasp of electromagnetic radiation. Right?

Not so fast. A new study of 76 supermassive black holes, combining analysis of observations with computer simulations, reveals that some galactic behemoths have magnetic fields powerful enough to counteract the enormous pull of their gravity—thereby allowing clouds of gas or other objects at the top of the magnetic fields to levitate temporarily in place above a supermassive black hole.

“This paper for the first time systematically measures the strength of magnetic fields near black holes,” said co-author Alexander Tchekhovskoy, a Lawrence Berkeley National Laboratory (LBNL) postdoctoral researcher who helped interpret observations within the context of computational models. “Now we have evidence from not just one or two, but from 76 black holes.”

Loud and twisted

Of interest are blazars: active galactic nuclei (AGNs) that beam extremely bright, energetic, collimated jets of gas at nearly the speed of light in the direction of the Earth. Such jets—which shoot out along the axis of rotation of a disk of gas accreting around a rotating black hole—emit powerful radiation at radio wavelengths. Only about one in ten AGNs have powerful radio-emitting jets.

From such radio emission independently observed by other astronomers at different frequencies using very long baseline interferometry (VLBI) from a vast network radio telescopes separated by thousands of miles, the authors determined the strengths of magnetic fields threading through the jets and central black holes of 68 blazars and eight nearby radio galaxies. Included were such famous galaxies as the beautiful spiral Messier 81 in Ursa Major, Centaurus A (the radio galaxy nearest to our Milky Way), and Cygnus A (a famous radio galaxy discovered in 1939 by radio astronomy pioneer Grote Reber).

The coauthors compared the predictions of the computer simulations to the measured magnetic field strengths and found good agreement. The simulations revealed that the magnetic fields, which are twisted by the rotation of a supermassive black hole, are strong enough to counteract the pull of gravity and retard the infall of gas. The twist also transfers black hole rotational energy to electromagnetic energy of the jets, which carry it out as far as several light-years away.

A heavy fluid (accreting gas) placed on top of a light fluid (a magnetic field) is an unstable configuration because the two fluids naturally want to change places, Tchekhovskoy explains. However, for a few hours, “the gas is slowed down by the presence of magnetic fields and even sometimes briefly stopped,” he says, so that the gas “continuously trickles down to the black hole” instead of falling unobstructed.

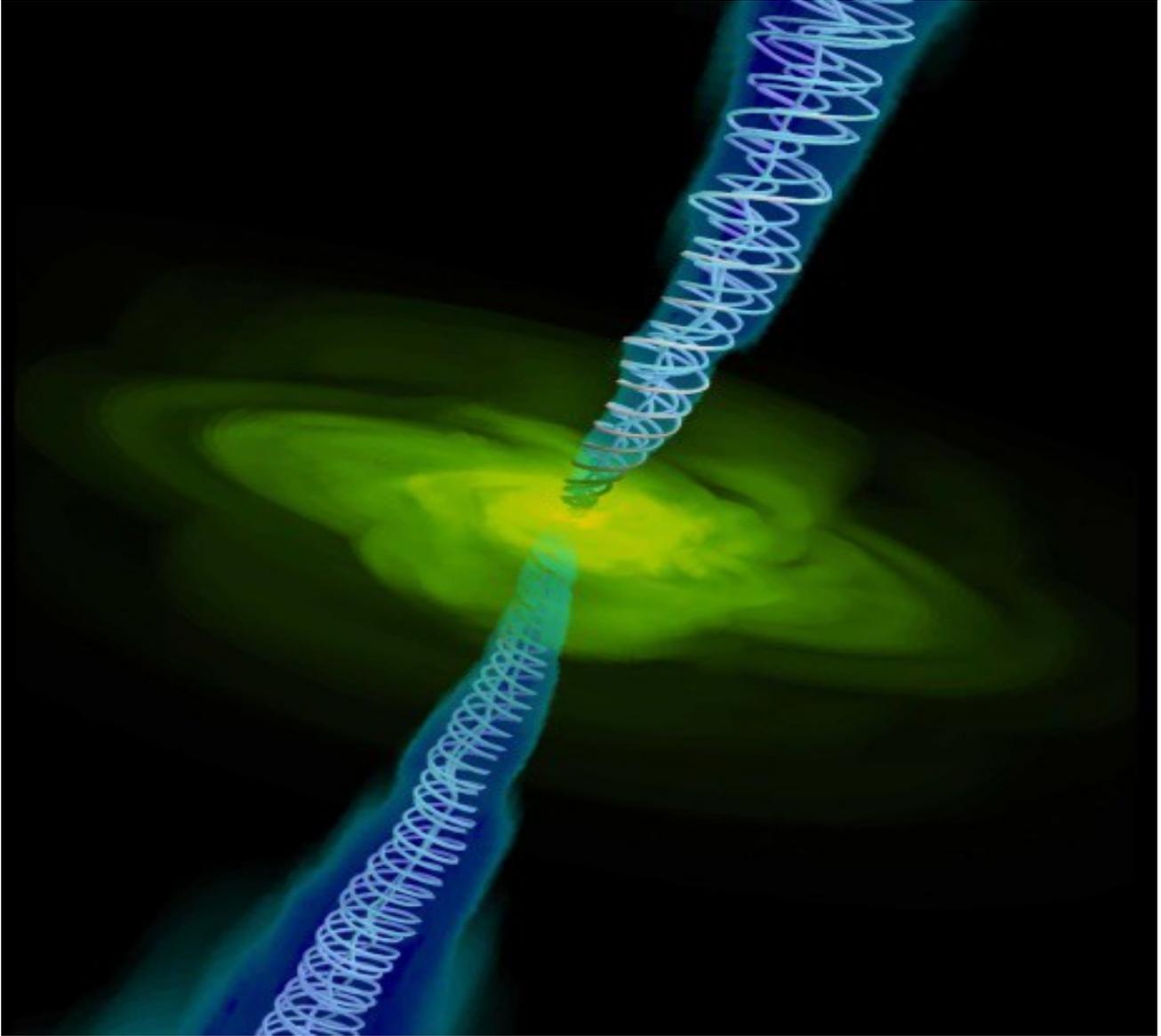
Back to the drawing board

Thus, “. . . the jet-launching regions of these radio-loud galaxies are threaded by dynamically important [magnetic] fields, which will affect the disk properties,” the authors conclude. “These fields obstruct gas infall, compress the accretion disk vertically, slow down the disk rotation by carrying away its angular momentum in an outflow, and determine the directionality of jets.”

Tchekhovskoy and his three coauthors from the Max Planck Institute for Radio Astronomy in Bonn, Germany, believe that the new results mean theorists must re-evaluate their understanding of how supermassive black holes behave. —*Trudy E. Bell, M.A.*

Further reading: The paper, “Dynamically important magnetic fields near accreting supermassive black holes,” by M. Zamaninasab, Eric Clausen-Brown, T. Savolainen, and Alexander Tchekhovskoy, published in *Nature* on June 5, 2014, is accessible from <http://www.nature.com/nature/journal/v510/n7503/full/nature13399.html>. A press release from LBNL is at <http://newscenter.lbl.gov/2014/06/04/black-holes/> and a release from the Max Planck Institute is at http://www.mpg.de/8256277/magnetic-fields_supermassive-black-holes.

The University of California High-Performance AstroComputing Center (UC-HIPACC), based at the University of California, Santa Cruz, is a consortium of nine University of California campuses and three affiliated Department of Energy laboratories (Lawrence Berkeley Lab, Lawrence Livermore Lab, and Los Alamos National Lab). UC-HIPACC fosters collaborations among researchers at the various sites by offering travel and other grants, co-sponsoring conferences, and drawing attention to the world-class resources for computational astronomy within the University of California system. More information appears at <http://hipacc.ucsc.edu>



A computer simulation shows gas (yellow) falling in the direction of a central black hole (too small to be seen). Twin jets (blue), strongly focused by spiral magnetic field lines, shoot out towards the top and bottom, perpendicular to the plane of the rotating accretion disk. Credit: Alexander Tchekhovskoy / LBNL



Secretary's Summary of August Meeting

- We were supposed to meet at LASM this month, but this fell through. So we covered a lot of small things at the Observatory this month.
- Next month (9/26) we need volunteers to help out at the Mini Maker Faire at the EBR Parish Library. It will probably be pretty much the same set up as last year with displays and demonstrations. The night after this (9/27) will be the total lunar eclipse at the Observatory which will also need volunteers. The same night as this will be a street party in Independence for Charles Genovese's birthday; this will include sky viewing with telescopes as well as other activities.
- Chris' highlights had to do with the Baker City Council meeting, the 85 people that showed up for Pluto/New Horizons party, and the 3-D model of New Horizons that Claire Luikhart of St. Joseph's Academy made with her printer (this got passed around so everyone could see). Chris gave a rundown of what happened at the Baker meeting; he has notes on this that he will hand out on request. He along with Susan Miller and Cathy Gable ran into Councilman Young at the Lagniappe Restaurant after the council meeting. A suggestion was made that we should do a couple of outreach events up there in the near future.
- The Perseid Meteor Shower coming up Wednesday evening was mentioned. Fireball sightings were already being reported; Ben mentioned that he and David had seen a couple from the BRAS dark sky site the night before. Marshall Spaceflight Center will carry this online. There will be 2 other minor showers originating from Capricorn and Aquarius this week as well.
- Chris ran through a list of the benefits of being member of BRAS; he passed a copy of this list out to everyone in attendance.
- Merrill read a portion of the appreciation letter that Erin Anding sent upon receiving the second telescope donated by BRAS to her school. He also mentioned the telescope that Astronomers Without Borders is currently selling as well as the AR152 6-in. refractor that Explore Scientific has available. Dave Dawson donated a 10-in. Orion Dobsonian with a lot of features that is going to be the next major raffle prize. There were several books as well as a small, slightly used Tasco on the table for that evening's raffle prizes.
- Trey gave a brief lecture about the recent New Horizons mission to Pluto. Then he pulled up the Powers of Ten video from YouTube for everyone's viewing pleasure.
- It was mentioned that now is the time to start planning for the total solar eclipse coming up on 8/21/17. Craig has some information on this and the AL convention in Casper, WY, and will make copies if needed.
- We have a donated ETX90 that needs some electronic work; someone is going to see if we can get a BRAS member with experience in this area to take a look at it.
- Ben was encouraging everyone to do Globe @ Night this month.
- Deep South is set for 11/3-8 this year. Merrill will give Ben the info for the newsletter.
- The monthly raffle took place. Trey is taking orders for 2016 Astronomy calendars.

Roslyn Readinger
BRAS Secretary

HRPO

FRIDAY NIGHT LECTURE SERIES

all start at 7:30pm

- 4 September: "LIGO—The Fantastic Search" (Amber Stuver)
- 11 September: "Astrophotography for Beginners" (Chris Desselles)
- 18 September: "Lunar Eclipses—History" (Brad Schaefer)
- 25 September: "Lunar Eclipses—Science" (Brad Schaefer)

SCIENCE ACADEMY

Saturdays from 10am to 12pm

For ages eight to twelve. \$5/\$6 per child.

- 5 September: "Power in the House II"
- 12 September: "Power in the House III"
- 19 September: "Cadet's Choice"
- 26 September: "Surveying the Sun"

MERCURY VIEWING

For all ages. Free admission.

- 5 September, 5pm to 7pm
- 12 September, 4:30pm to 6:30pm

MERCURY VIEWING

For all ages. Free admission.

- 26 September, 12pm to 2pm

CALL FOR VOLUNTEERS

*Saturday, 19 September from 7pm to 10pm. *Two volunteers in addition to regular Plus Night complement.* **Observe the Moon Night.** Marshmallow roast, demo tables, desk duty. Easy; training provided.

*Sunday, 27 September from 6:30pm to 12:30am. **Total Lunar Eclipse.** *Three volunteers.* Desk duty. Easy; training provided.

IMY © IRMA ERIKSSON

<http://www.imycomic.com>

#589 - 'THE ASTEROID'



TOTAL LUNAR ECLIPSE

Sunday, 27 September from 6:30pm to 12:30am

Free admission. For all ages.

This is the fourth and final of the 2014/2015 *tetrad* of total lunar eclipses, and weather permitting it promises to be the best for Baton Rouge.

TIMELINE

Partial Eclipse Begins: 8:07 pm CDT

Total Eclipse Begins: 9:11 pm CDT

<<Point of Greatest Eclipse: 9:48 pm CDT>>

Total Eclipse Ends: 10:23 pm CDT

Partial Eclipse Ends: 11:27 pm CDT

OTHER CELESTIAL OBJECTS

*The Moon will be between Uranus and Neptune this night. During the full eclipse, viewing of Uranus and Neptune will take place.

* During the last hour of this viewing period patrons will get a sneak preview of one of the most beloved winter sights—the Pleiades star cluster.

WHERE THE PUBLIC CAN VIEW ON HRPO PROPERTY

The public should not set up lawn chairs or blankets without receiving direction from HRPO personnel. Visitors may use only the lawn area south of the 16OGS building. They *should not* use any concrete for sitting or lying as that creates a tripping hazard.

RETAINING NIGHT VISION

Please encourage the general public to keep headlights off. Encourage the outfitting of white flashlights with red construction paper, a red stretch balloon, red cellophane (several layers may be needed to make the light suitably dim) or a thin coat of red nail polish.

SOME MISCELLANEOUS RULES

- * **No glass containers are allowed.**
- * **Pets must remain under control and on a leash at all times.**
- * **Running is not allowed outside at night, or inside at any time.**
- * **Alcohol, smoking and loud music are not allowed.**



Recent Entries in the Forum

Below are selected recent additions to the BRAS Forum. There are also [nine active polls](#).

Results of 2015 [ARRL Field Day](#)
The [Orion Explorer 10x50 WA Binocular](#)
[Pluto Noon](#) Illumination Images
Marty Starts [Snapping Pics](#)
Ben Toman and Trey Anding Capture [Pluto](#)
[Dark Sky Advocacy](#) Page Gets Updated
Next [GLOBE at Night](#) Session Begins 3 September
[Expedition 44](#) Compliment is Complete
Second [Commercial Spaceflight](#) Talk at HRPO
Curiosity Investigates [Martian Sandstone](#)
[Apollo 11](#) Anniversary Thank You
Sixty-Fifth Anniversary of the [Bumper V-2](#)
[Rainbow](#) at HRPO on 17 July
[Noctilucent Clouds](#) in Sweden
[2015 OQ21](#) Approach on 23 July
[Pluto Occults Mag Twelve Star](#) in Sagittarius
Plenty of Scientific Revelations from the [Pluto Flyby](#)
Once Again, Southern Hemisphere Gets the [Comet](#)
Time Spent Looking at [Altair](#) and [Tarazed](#)
When Does [Sirius](#) Have its Baton Rouge Heliacal Rising?
Main Components of [Rho Ophiuchi](#) Spotted at HRPO
LSU Physics has a Hand in [CALET Mission](#)

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20/20 Vision Campaign

Light Pollution Committee: 14 September, 6:15pm

BRAS was allowed to present for three to five minutes during the Baker City Council meeting on Tuesday 28 July, 6pm at the Baker Municipal Center on Groom Road. BRAS stated that it was founded in 1981 and was part-owner of HRPO. BRAS assured that it was not asking for any streetlamps to be taken down, but that when one burned out or broke it be replaced with a full cut-off light. BRAS used as an example of full cut-off lighting those along the stretch of I-110 near the Metropolitan Airport. BRAS noted that this correct directing of light can make driving at night safer. BRAS also rhetorically asked how many children alive today have seen the Milky Way. BRAS mentioned that in several previous instances of a municipality shielding streetlamps or switching them to full cut-off that municipality's electrical bill dropped.

20/20 VISION CAMPAIGN CHECKLIST

All BRAS members need to perform these simple tasks during 2015.

____ Ask my community's Public Works Department to cap the streetlamp(s) nearest my home. [Record date and time of conversation, official on other end of line, and response.]

____ Thank at least one business/government entity per month for using capped outdoor lighting. [Record date, time and entity.]

____ Request at least once monthly that a business /government entity shield a security fixture that is sending light into the street. [Record date, time, entity and response.]

____ Take measurements for GLOBE at Night at *three* of these places:

- *personal residence
- *personal workplace
- *family member's school
- *friend's home
- *a campground
- *LSU or SU or BRCC

This Campaign will be successful only if a majority of BRAS members take part. To this point our dark sky concerns have received sympathetic responses from EBRP Public Works, Bluebonnet Swamp Nature Center, the Atchafalaya Trace Commission and the Baker City Council. Also, there are at least five different traffic locations in East Baton Rouge Parish with FCO lighting.



