

*Igniting passion for science through the lens of astronomy!*



**Ritchie Dome Replacement Update**  
from [Peter Moseley](#)



Bob Mathisrud, Peter Moseley and Patrick Clanton nearly completed the work on the new shutter and it should go to the powder coating service next week. Patrick's welding is beautiful. Peter keeps wringing his hands and saying "I sure hope it fits".

We have to engage some riggers and come up with the installation plan.

While we've been at this, Frank and Peter have been developing and installing the on-board shutter control system that will allow the shutter to be operated with out having to be plugged in. This will enable fully remote operation of the telescope.

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## Planetarium Update from [Erin Howard](#)

We are looking for Planeteers! We need volunteers to help run the planetarium shows, both at the Rudolph Planetarium and at outreach events with our portable dome. Training is provided! The system is incredibly user-friendly and doesn't require a lot of training to get started. If folks are interested, they can send me an [email](#) or find me (Erin) on Discord.

After our November 11th 2nd Saturday program (see details below), I (Erin) will be giving a planetarium show about what we can expect to see in our November skies. Ticket link coming soon!

Finally, we need help with social media! If anyone has a background in social media and wants to volunteer their time to help us reach greater heights, BPAA (especially the planetarium!) is in need of a social media manager.

## Ritchie Observatory Updates from [Cole Rees](#)

1. New and improved discord! We've made a ton of changes to make it much more accessible and understandable. Jumping in on our activities has never been easier!
2. Good progress on the dome shutter. See article above for details.
3. Planetarium is coming together! We're almost ready to hang the dome and start doing shows again.
4. We are still looking for volunteers to help out with most of the projects. If people would like to get involved, they need to get on the discord to see the active progress on projects.

## Message from President [Frank Petrie](#)

We're entering the cold, cloudy, rainy season, when stargazing opportunities are few. However when they do occur, the sky is spectacular! The cold, crisp air clears out all the dust and water vapor that degrades our summer seeing here in the Pacific Northwest. So if you dare brave the cold, be sure to join us at our winter star parties. And if cold is not your thing, we have the new planetarium and expanded program offerings coming soon, under the very capable leadership of our incoming Education Director Erin Howard. Either way, we look forward to seeing you under the stars!

## **Upcoming Event: 2nd Saturday Program**

**November 11, 6:00pm**

### **Understanding Stellar Explosions: A Problem for the World's Most Powerful Computers**

**Dr Bronson Messer, Oak Ridge National Laboratory**

The study of exploding stars touches on a variety of questions including the origin of the chemical elements, the formation of neutron stars and black holes, the generation of gravitational waves, and more. At Oak Ridge National Laboratory (ORNL), we model supernovae—both core-collapse and thermonuclear types—using extreme-scale computational resources. I will discuss some of the recent triumphs and challenges associated with gaining this understanding using the world's biggest computers.

Dr Bronson Messer is a Distinguished Scientist and Director of Science at the Oak Ridge Leadership Computing Facility (OLCF) at ORNL. He is also a Joint Faculty Professor in the Department of Physics & Astronomy at the University of Tennessee. His primary research interests are related to the explosion mechanisms and phenomenology of supernovae (both thermonuclear and core-collapse), especially neutrino transport and signatures, dense matter physics, and the details of turbulent nuclear combustion.

Dr Messer's presentation will be available via Zoom. You can watch it from home for free, or in person at the observatory for a \$10 admission fee (free for BPAA members).

In-person attendance is limited to 30, and advance registration is required for admittance, so please register today.

For in-person attendees as stated above, Erin Howard will give a planetarium show following the presentation, after which we will have a star party (if weather allows).

Access the [BPAA Events](#) page to register.

### **Upcoming Event(s): Telescope Tuesdays**

**Every Tuesday, 10:00am - 2:00pm**

As our Chief Astronomer Cole Rees alluded to in his updates on the Ritchie observatory, we still need volunteers to support those activities! Every Tuesday at 10am, work parties are formed to tackle those modifications. An enormous amount of progress has been made, but we still have quite a bit more to do. If you can, please come out and support Telescope Tuesdays!

**Upcoming Event: Cosmic Conversations  
Gravitational Lensing  
November 21, 7:00pm**

On the third Tuesday of each month, we have been engaging in COSMIC CONVERSATIONS at the Ritchie Observatory in Battle Point Park. These are open to members and operate much like a book group, wherein we pick a topic, read some background material and then discuss what we've learned. These are nonmathematical discussions where we hope to learn from each other.

The topic for the next meeting is "Gravitational lensing". Here are a couple of links on this subject that serve as good pre-reads for the meeting:

[What is gravitational lensing? | Space](#)

[Gravitational lens - Wikipedia](#)

**Upcoming Event: Annual Meeting**

**January 10, 2024, 7:00 pm**

Mark your calendars and save the date! BPAA's Annual Meeting will be held on Wednesday January 10th at 7:00 pm at the Ritchie Observatory. Details will be in next month's Observer.

## Member Contributed Images

### Embryo Nebula - NGC 1333



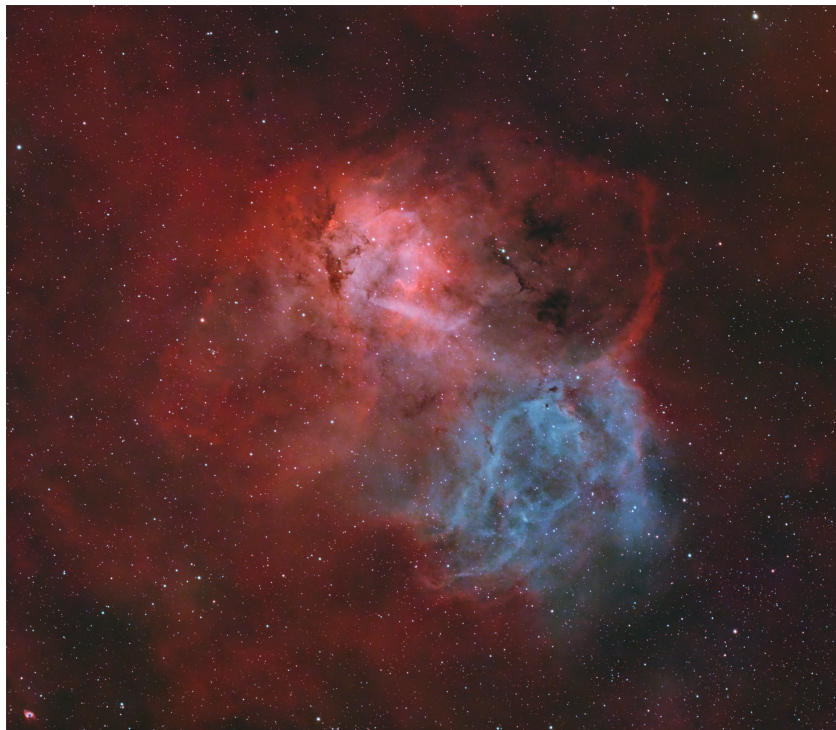
Credit: Brian Puhl

Dust, dust and more dust. I love dust, but processing it, that's another story. A little project I have been working on for the past month or so. Once moon conditions stopped being favorable, I went to work. For this image, I employed a little trick some of us have been experimenting with.... dividing my luminance data into three separate stacks, combining them as if they were RGB, and applying DeepSNR to them. DeepSNR requires 3 channels with distinct noise patterns to work, so this effectively is a bit of a cheat to the current version of the tool, but it works extremely well. The Ha data was added to the image using [@Charles Hagen's](#) methods as outlined on his website: <https://www.nightphotons.com/guides/advanced-narrowband-combination>

Personally, I love the feeling of depth the Hydrogen layer gives this image. It was really neat to see it all come together, the Ha is clearly behind the dust. Colors became a bit of an issue. Personally, I love warm dust, but warm dust requires a significant amount of red, and combine that with the Ha addition to a narrowband image, it became a bit overpowering. I experimented quite a few ways with this one, but ultimately came back to the warm dust. It just didn't feel right with cooler color tones. Also, the pure chaos that's exposed in NGC1333 just drops my jaw. It's amazing. Hope you enjoy this unique view on a fairly common fall target.

For additional information, use this [link](#).

## Lion Nebula - SH2-132

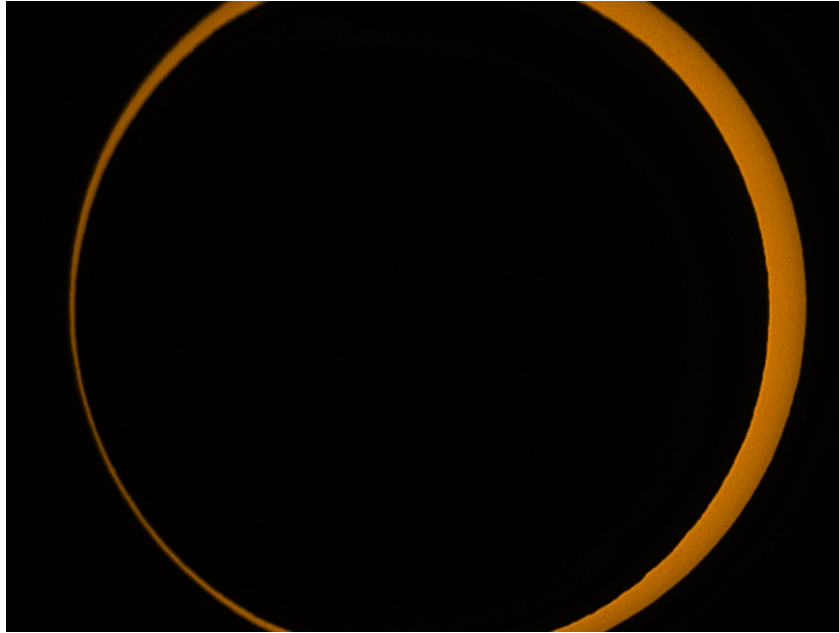


Credit: Mario Alejandro Torres

This is the first time I've embarked on a serious integration project (at least serious compared to what I had done in the past). Before, I was satisfied with getting some signal from just a couple of hours that would show some results. While processing this data, I learned more about the limitations of my gear and understood the characteristics I should focus on to obtain the best possible image from said equipment. That being said, I still believe I need to learn and practice my processing skills since I switched to using PixInsight about a couple of months ago. Even though this image is far from perfect, to me, it signifies the slow, steady progress in this incredible hobby.

For additional information, use this [link](#).

## Annular Eclipse



Credit: Erin Howard

This image was taken on a Unistellar eQuinox in Klamath Falls, Oregon on October 14, 2023, at 1620 UTC.

# WHAT'S UP(COMING)!

Source for events and links are [In-The-Sky.org](http://In-The-Sky.org), Dominic Ford, Editor. The links provide details for each event including a scale on how difficult they are to observe.

- Nov 2 – [Jupiter at opposition](#)
  - Nov 5 – [Asteroid 18 Melpomene at opposition](#)
  - Nov 12 – [Northern Taurid meteor shower peak](#)
  - Nov 13 – New Moon
    - [Uranus at opposition](#)
  - Nov 18 – [Leonid meteor shower peak](#)
    - [The Pleiades cluster is well placed](#)
  - Nov 22 –  [\$\alpha\$ -Monocerotid meteor shower peak](#)
  - Nov 27 – Full Moon
  - Nov 28 – [November Orionid meteor shower peak](#)
    - [The Hyades cluster is well placed](#)
  - Dec 6 – [December  \$\phi\$ -Cassiopeid meteor shower peak](#)
  - Dec 9 – [Monocerotid meteor shower peak](#)
  - Dec 12 – New Moon
    - [Comet 144P/Kushida passes perigee](#)
    - [\$\sigma\$ -Hydrid meteor shower peak](#)
  - Dec 14 – [Geminid meteor shower peak](#)
  - Dec 15 – [The Running Man cluster is well placed](#)
  - Dec 16 – [Comae Berenicid meteor shower peak](#)
  - Dec 20 – [December Leonis Minorid meteor shower peak](#)
  - Dec 21 – [Asteroid 4 Vesta at opposition](#)
  - Dec 22 – [Asteroid 9 Metis at opposition](#)
  - Dec 23 – [Ursid meteor shower peak](#)
  - Dec 25 – [Comet 62P/Tsuchinshan passes perihelion](#)
  - Dec 26 – Full Moon
  - Dec 27 – [Asteroid 5 Astraea at opposition](#)
  - Dec 29 – [The cluster NGC 2232 is well placed](#)
  - Dec 30 – [The Rosette Nebula is well placed](#)
  - Jan 2 – [The cluster Messier 41 is well placed](#)
  - Jan 4 – [Quadrantid meteor shower peak](#)
  - Jan 11 – New Moon
  - Jan 15 – [The cluster Messier 47 is well placed](#)
  - Jan 19 –  [\$\gamma\$ -Ursae Minorid meteor shower peak](#)
    - [Asteroid 354 Eleonora at opposition](#)
  - Jan 25 – Full Moon
  - Jan 31 – [The Beehive cluster is well placed](#)
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Here are some interesting things going on in Astronomy. If they pique your curiosity, please follow the link at the bottom of each for the full article!

## The Crab Nebula Seen in New Light by NASA's Webb



NASA's James Webb Space Telescope has gazed at the Crab Nebula in the search for answers about the supernova remnant's origins. Webb's NIRCam (Near-Infrared Camera) and MIRI (Mid-Infrared Instrument) have revealed new details in infrared light. Credits: NASA, ESA, CSA, STScI, Tea Temim (Princeton University)

NASA's James Webb Space Telescope has gazed at the Crab Nebula, a supernova remnant located 6,500 light-years away in the constellation Taurus. Since the recording of this energetic event in 1054 CE by 11th-century astronomers, the Crab Nebula has continued to draw attention and additional study as scientists seek to understand the conditions, behavior, and after-effects of supernovae through thorough study of the Crab, a relatively nearby example.

Using Webb's NIRCam (Near-Infrared Camera) and MIRI (Mid-Infrared Instrument), a team led by Tea Temim at Princeton University is searching for answers about the Crab Nebula's origins.

"Webb's sensitivity and spatial resolution allow us to accurately determine the composition of the ejected material, particularly the content of iron and nickel, which may reveal what type of explosion produced the Crab Nebula," explained Temim.

At first glance, the general shape of the supernova remnant is similar to the [optical wavelength image released in 2005 from NASA's Hubble Space Telescope](#): In Webb's infrared observation, a crisp, cage-like structure of fluffy gaseous filaments are shown in red-orange. However, in the central regions, emission from dust grains (yellow-white and green) is mapped out by Webb for the first time.

(Source: [webbtelescope.org](http://webbtelescope.org))

## Hubble Captures Galaxy Pair Arp-Madore 2339-661



Credit: ESA/Hubble and NASA, J. Dalcanton, Dark Energy Survey/DOE/FNAL/NOIRLab/NSF/AURA;  
Acknowledgement: L. Shatz

This striking image from the NASA/ESA Hubble Space Telescope captures the interacting galaxy pair known as Arp-Madore 2339-661. The Arp-Madore catalog is a collection of peculiar galaxies, and this group's particular peculiarity might be odder than first meets the eye, as there are three galaxies interacting here, not just two.

The two clearly defined [galaxies](#) are NGC 7733 (smaller, lower right) and NGC 7734 (larger, upper left). The third galaxy is currently referred to as NGC 7733N and is visible if you look carefully at the upper arm of NGC 7733. There you can spot a knot-like structure, glowing with a different color than the arm and obscured by dark dust. This could easily pass as part of NGC 7733, but analysis of the velocities (speed and direction) involved reveals that this knot has a considerable additional redshift.

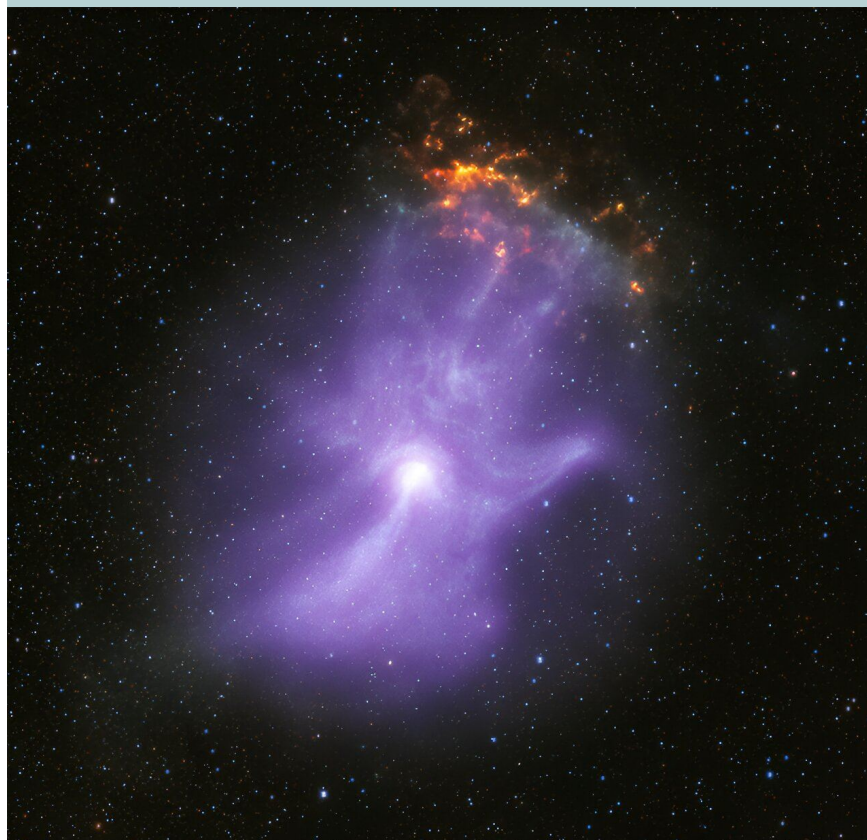
This means it is very likely its own entity and not part of NGC 7733. This [galaxy group](#) presents one of the many challenges that observational astronomers face: working out whether an [astronomical object](#) really is just one, or multiple objects, one lying in front of another as seen from Earth's perspective.

All three galaxies lie quite close to each other, roughly 500 million light-years from Earth in the constellation Tucana, and, as this image shows, they are interacting gravitationally with one another. In fact, some science literature refers to them as a 'merging group,' which means they will ultimately become a single entity.

(Source: [phys.org](#))

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## NASA X-Ray Telescopes Reveal The 'Bones' Of A Ghostly Cosmic Hand



Credit: X-ray: NASA/CXC/Stanford Univ./R. Romani et al. (Chandra); NASA/MSFC (IXPE); Infrared: NASA/JPL-Caltech/DECaPS; Image Processing: NASA/CXC/SAO/J. Schmidt

In 1895, Wilhelm Röntgen discovered X-rays and used them to image the bones in his wife's hand, kicking off a revolutionary diagnostic tool for medicine. Now two of NASA's X-ray space telescopes have combined their imaging powers to unveil the magnetic field "bones" of a remarkable hand-shaped structure in space. Together, these telescopes reveal the behavior of a dead collapsed star that lives on through plumes of particles of energized matter and antimatter.

Around 1,500 years ago, a [giant star](#) in our galaxy ran out of nuclear fuel to burn. When this happened, the star collapsed onto itself and formed an extremely dense object called a neutron star.

Rotating neutron stars with [strong magnetic fields](#), or pulsars, provide laboratories for extreme physics, with conditions that cannot be replicated on Earth. Young pulsars can create jets of matter and antimatter moving away from the poles of the pulsar, along with an intense wind, forming a [pulsar wind nebula](#).

In 2001, NASA's Chandra X-ray Observatory first observed the pulsar PSR B1509-58 and revealed that its pulsar wind nebula (referred to as MSH 15-52) resembles a human hand. The pulsar is located at the base of the "palm" of the nebula. MSH 15-52 is located 16,000 light-years from Earth.

Now, NASA's newest X-ray telescope, the Imaging X-ray Polarimetry Explorer (IXPE), has observed MSH 15-52 for about 17 days, the longest it has looked at any single object since it launched in December 2021.

"The IXPE data gives us the first map of the [magnetic field](#) in the 'hand,'" said Roger Romani of Stanford University in California, who led the study. "The [charged particles](#) producing the X-rays travel along the [magnetic field](#), determining the basic shape of the nebula, like the bones do in a person's hand."

(Source: [phys.org](#))

## NASA's Webb Discovers New Feature in Jupiter's Atmosphere



This image of Jupiter from NASA's James Webb Space Telescope's NIRCam (Near-Infrared Camera) shows stunning details of the majestic planet in infrared light. In this image, brightness indicates high altitude. The numerous bright white "spots" and "streaks" are likely very high-altitude cloud tops of condensed convective storms. Auroras, appearing in red in this image, extend to higher altitudes above both the northern and southern poles of the planet. By contrast, dark ribbons north of the equatorial region have little cloud cover. In Webb's images of Jupiter from July 2022, researchers recently discovered a narrow jet stream traveling 320 miles per hour (515 kilometers per hour) sitting over Jupiter's equator above the main cloud decks. Credits: NASA, ESA, CSA, STScI, Ricardo Hueso (UPV), Imke de Pater (UC Berkeley), Thierry Fouchet (Observatory of Paris), Leigh Fletcher (University of Leicester), Michael H. Wong (UC Berkeley), Joseph DePasquale (STScI)

NASA's James Webb Space Telescope has discovered a new, never-before-seen feature in Jupiter's atmosphere. The high-speed jet stream, which spans more than 3,000 miles (4,800 kilometers) wide, sits over Jupiter's equator above the main cloud decks. The discovery of this jet is giving insights into how the layers of Jupiter's famously turbulent atmosphere interact with each other, and how Webb is uniquely capable of tracking those features.

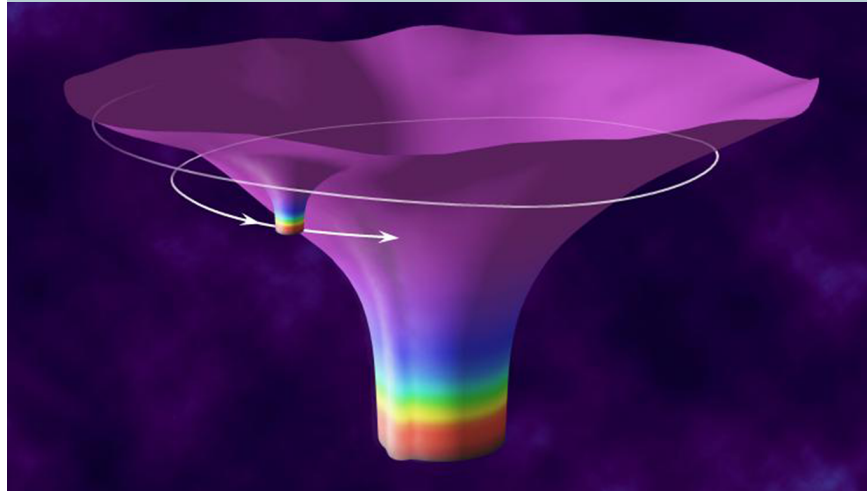
"This is something that totally surprised us," said Ricardo Hueso of the University of the Basque Country in Bilbao, Spain, lead author on the paper describing the findings. "What we have always seen as blurred hazes in Jupiter's atmosphere now appear as crisp features that we can track along with the planet's fast rotation."

The research team analyzed data from Webb's NIRCam (Near-Infrared Camera) captured in [July 2022](#). The [Early Release Science](#) program – jointly led by Imke de Pater from the University of California, Berkeley and Thierry Fouchet from the Observatory of Paris – was designed to take images of Jupiter 10 hours apart, or one Jupiter day, in four different filters, each uniquely able to detect changes in small features at different altitudes of Jupiter's atmosphere.

(Source: [webbtelescope.org](https://webbtelescope.org))

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## Black Hole Rain



This artist's impression shows the geometry of spacetime in an extreme-mass-ratio inspiral, in which a smaller black hole spirals in toward a supermassive black hole and ultimately merges. Credit: NASA

At the center of nearly every massive galaxy sits at least one supermassive black hole. These black holes weigh in at millions or even billions of times the mass of the Sun. They're gregarious beasts, surrounded by a swarm of stars and stellar-mass black holes in the galactic equivalent of a bustling metropolis's downtown.

Occasionally, the small black holes (we're talking masses of a few to a few dozen Suns) gravitationally nudge each one. Eventually, these nudges can shove some of the objects onto slingshot orbits around the supermassive black hole. But this is an unsteady arrangement, and the little black holes spiral closer to the big one. As the objects swirl down the gravitational drain toward their doom, gravitational waves ripple out and away, carrying away the orbital energy until plink, the little black hole merges with the big one, like a drop falling into a bucket.

These extreme mass-ratio inspirals (EMRIs) are one of the main targets for the upcoming Laser Interferometer Space Antenna (LISA), a European-led project set to launch in the mid-2030s. LISA will detect gravitational waves with frequencies between 0.1 millihertz and 1 Hz, much lower than [those that LIGO and its cohorts sense](#). Tuning into this frequency band will give astronomers access to mergers involving supermassive black holes, which current ground-based detectors can't hear.

(Source: [skyandtelescope.org](http://skyandtelescope.org))

## Light Pollution Affects Migratory Birds



Workers at the Chicago Field Museum inspect the bodies of migrating birds that were killed when they flew into the windows of the McCormick Place Lakeside Center. Courtesy Tom Gnoske/Chicago Field Museum

As documented in the [CNN article](#) excerpted below, migrating birds are dying in large numbers when colliding with large, lighted buildings during their night flights. An article in the October edition of the Kingston Community News by Brendan McGarry shows this is an issue locally, too. The article states, "between 100 million and 1 billion birds are killed by light pollution each year in the U.S." Organizations like Birds Connect Seattle (formerly Seattle Audobon) and BirdCast.org are working to raise awareness on this issue.

"In just one night, more than a thousand migrating birds died after crashing into a single building in Chicago, due to what experts say was a deadly combination of migration season, difficult weather, and a lack of "bird-friendly" building measures.

The Chicago Field Museum collected more than a thousand dead birds that had collided with the McCormick Place Lakeside Center, a convention center located on the shore of Lake Michigan, Wednesday night into Thursday morning, Annette Prince, director of [Chicago Bird Collision Monitors](#), told CNN."

(Source: [cnn.com](#))

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