Cathay August 2022

www.cathayradio.org

President: George Chong, W6BUR **email:** *W6BUR@comcast.net*
Vice President North: Leonard Tom, *NX6E* **email:** nx6e@hotmail.com
Vice President South: Bill Fong, *W6BBA* - **email:** w6bba@arrl.net
Secretary/Membership: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Editor: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Treasurer: Vince Chinn aka Mingie, *W6EE* - **email:** vince@vincechinncpa.com
Web Master: Edison Fong – *WB6IQN* - **email:** edison_fong@hotmail.com
Mission: The Cathay Amateur Radio Club is basically an active social club of Ham Radio Operators and their spouses. We support local community requests for HAM emergency communications. Several of us are trained in CPR/ First Aid and are involved with community disaster preparedness.

Monday Night Net Time: 9 PM Local Time/PST, Repeater: WB6TCS - RX 147.210, TX 147.810, Offset +0.6 MHz, CTCSS/Tone PL100 Hz

Please note: Repeater: N6MNV UHF 442.700 Mhz, Offset +5MHz, CTCSS/Tone PL 173.8 Hz in South San Francisco is cross linked every Monday Night Net at 9 p.m. to WB6TCS 2-meter repeater.

The CARC Monday night net is the best way to find out the latest club news. All check-ins are welcome.

Message from the President: George Chong, *W6BUR*

Hello CARC Members and Friends;

Many thanks to Mr. Denis L. Moore – WB6TCS for the use of his repeater for our CARC Monday Night Net.

I wish to thank our CARC members that set aside their valuable time to participate in our Monday night's nets.

Special Announcement:

Memorial Service for Bill Chin - KC6POF on Saturday August 20, 2022 at 11:00 am

First Chinese Baptist Church
15 Waverly Place
San Francisco, CA 94108

Remote Memorial Services for Bill Chin – KC6POF on Saturday August 20, 2022 at 10:45 am

For those who are unable to attend in person, the Bill Chin Memorial will be Live-streamed on YouTube - 8/20/2022 at 10:45 am

8/20/2022 Bill Chin Memorial, URL: https://www.youtube.com/watch?v=DUo0Rb1c-lM

Memorial Luncheon for Bill Chin – KC6POF on Saturday August 20, 2022 at 12:30 p.m.

Far East Cafe
631 Grant Ave.
San Francisco, CA 94108

Tech Article Introduction:

This new Tech Article is about a discovery of the first free-floating black hole in the Milky Way galaxy.

Please read the **Tech Section** of this newsletter for additional information.

Chat sub s'em to all you CARC members! - George W6BUR, **CARC President**.

Public Service Announcements

HAM CRAM / HAM Licensing

For upcoming HAM Licensing locations please refer to:

http://www.arrl.org/find-an-amateur-radio-license-exam-session

Auxiliary Communications Service (ACS)

The Auxiliary Communications Service (ACS) is a unit of trained professionals who supply communications support to the agencies of the City and County of San Francisco, particularly during major events/incidents. ACS goals are the support of gathering and distribution of information necessary to respond to and recover from a disaster.

The ACS Net begins at 1930 hours (7:30 p.m. PT) local time each Thursday evening, on the WA6GG repeater at 442.050 MHz, positive offset, tone 127.3 Hz. The purpose of this net is to practice Net Control skills, practice checking in with deployment status in a formal net, and to share information regarding upcoming ACS events. Guests are welcome to check in. ACS members perform Net Control duty on a regular basis
On the second Thursday of each month, the net is conducted in simplex mode on the output frequency of the WA6GG repeater, 442.050 MHz no offset, tone 127.3 Hz.

ACS holds its General Meetings on the third Tuesday of each month from 1900 hours to 2100 hours local time. Currently meeting are exclusively conducted over Zoom during the COVID-19 pandemic, ACS looks forward to meeting in person again as soon as possible.

Upcoming meeting dates in 2022 are:

- August 16, 2022
- Sept 20, 2022
- Oct 18. 2022

Location of in person future ACS meetings are yet to be determined as the regular location is under reconstruction until January 2023. All interested persons are welcome to attend. For further information, contact Corey Siegel KJ6LDJ <kj6ldj@gmail.com>.

For more information, please attend an ACS meeting, check in on the ACS radio net, or call 415-558-2717.

Free Disaster Preparedness Classes In San Francisco – NERT Taught by San Francisco Fire Department (SFFD).

http://sf-fire.org/calendar-special-events

TBD

+ Recertifications –

Who: NERT graduates with a NERT ID expiration of November 2019 to February 2022

When: Saturday August 13, 9:00 AM - 12:00 PM *OR* 1:00 PM - 4:00 PM

Where: 19th Street and Folsom Street, SFFD Division or Training

CLICK HERE TO REGISTER FOR THE 9 AM SESSION

CLICK HERE TO REGISTER FOR THE 1 PM SESSION

Sign Up For Training Classes

This is not for a specific date or location.

San Francisco Fire Department is collecting contact details from prospective students so we can let you know when classes are available. We will email you when classes become available. We plan on holding multiple trainings for new NERTs in 2022 and the information you provide will help us plan. Thank you!

https://www.eventbrite.com/e/never-taken-nert-before-let-us-know-you-are-interested-in-2022-trainings-tickets-125825993935?aff=odcleoeventsincollection

***SFFD DOT** is the Fire Department Division of Training. All participants walking, biking or driving **enter through the driveway gate on 19th St.** between Folsom and Shotwell. Parking is allowed along the back toward the cinderblock wall.

Visit ***www.sfgov.org/sffdnert*** to learn more about the training, other locations, and register on line.   Upcoming Special NERT Events.

San Francisco Police Department: Auxiliary Law Enforcement Response Team (ALERT)

The Auxiliary Law Enforcement Response Team (ALERT) is a citizen disaster preparedness program designed. The ALERT program is for volunteers 16 years of age or older, who live, work, or attend high school in San Francisco.

Graduates of the San Francisco Police Activities League (P.A.L) Law Enforcement Cadet Academy are also eligible to join.

ALERT volunteers will no longer need to complete the Fire Department's Neighborhood Emergency Response Team (NERT) (www.sfgov.org/sfnert) training and then graduate into two 8 hour Police Department course specifically designed for ALERT team members.

ALERT members will work closely with full-time and/or Reserve Police Officers in the event they are deployed after a disaster. The Basic ALERT volunteer will have no law enforcement powers other than those available to all citizens.

<u>SFPD ALERT Training (New Members)</u>

The next SFPD ALERT training class has been scheduled for: TBD

* Class date indicated are only for new members

IMPORTANT- All participants must complete the background interview process in order to be eligible to attend the ALERT training class.

Eligible ALERT participants may register for a training class by contacting the ALERT Program Coordinator, Marina at sfpdalert@sfgov.org, or by telephone at 415-401-4615.

<u>SFPD ALERT Practice/Training Drill</u>

All active/trained ALERT members are asked to join us for our next training drill, via scheduled for on

TBD

For more information on the San Francisco Police Department ALERT Program, email us at sfpdalert@sfgov.org, or call Lt. Marina Chacon (SFPD Ret.), SFPD ALERT Program Coordinator, at (415) 401-4615.

For additional information on the web please refer to:
https://sfgov.org/policecommission/alert

Tech Article

Berkeley News

[Research](), [Science & environment]()

Astronomers may have detected a 'dark' free-floating black hole

By Robert Sanders, Media relations| June 10, 2022

https://news.berkeley.edu/2022/06/10/astronomers-may-have-detected-a-dark-free-floating-black-hole/

YouTube: https://www.youtube.com/watch?v=uXlj1WYDZEg

Astronomers may have discovered the first free-floating black hole in the Milky Way galaxy, thanks to a technique called gravitational microlensing. With new observations, they hope to find many more such ghost stars.

Video by Roxanne Makasdjian and Alan Toth, with microlensing animations from Casey Lam and Sean Terry, UC Berkeley's Moving Universe Lab, and image data courtesy of the OGLE collaboration.

Additional images courtesy of the National Science Foundation and NASA.

If, as astronomers believe, the death of large stars leave behind black holes, there should be hundreds of millions of them scattered throughout the Milky Way galaxy. The problem is, isolated black holes are invisible.

Now, a team led by University of California, Berkeley, astronomers has for the first time discovered what may be a free-floating black hole by observing the brightening of a more distant star as its light was distorted by the object's strong gravitational field — so-called gravitational microlensing.

The team, led by graduate student Casey Lam and Jessica Lu, a UC Berkeley associate professor of astronomy, estimates that the mass of the invisible compact object is between 1.6 and 4.4 times that of the sun. Because astronomers think that the leftover remnant of a dead star must be heavier than 2.2 solar masses in order to collapse to a black hole, the UC Berkeley researchers caution that the object could be a neutron star instead of a black hole. Neutron stars are also dense, highly compact objects, but their gravity is balanced by internal neutron pressure, which prevents further collapse to a black hole.

Whether a black hole or a neutron star, the object is the first dark stellar remnant — a stellar "ghost" — discovered wandering through the galaxy unpaired with another star.

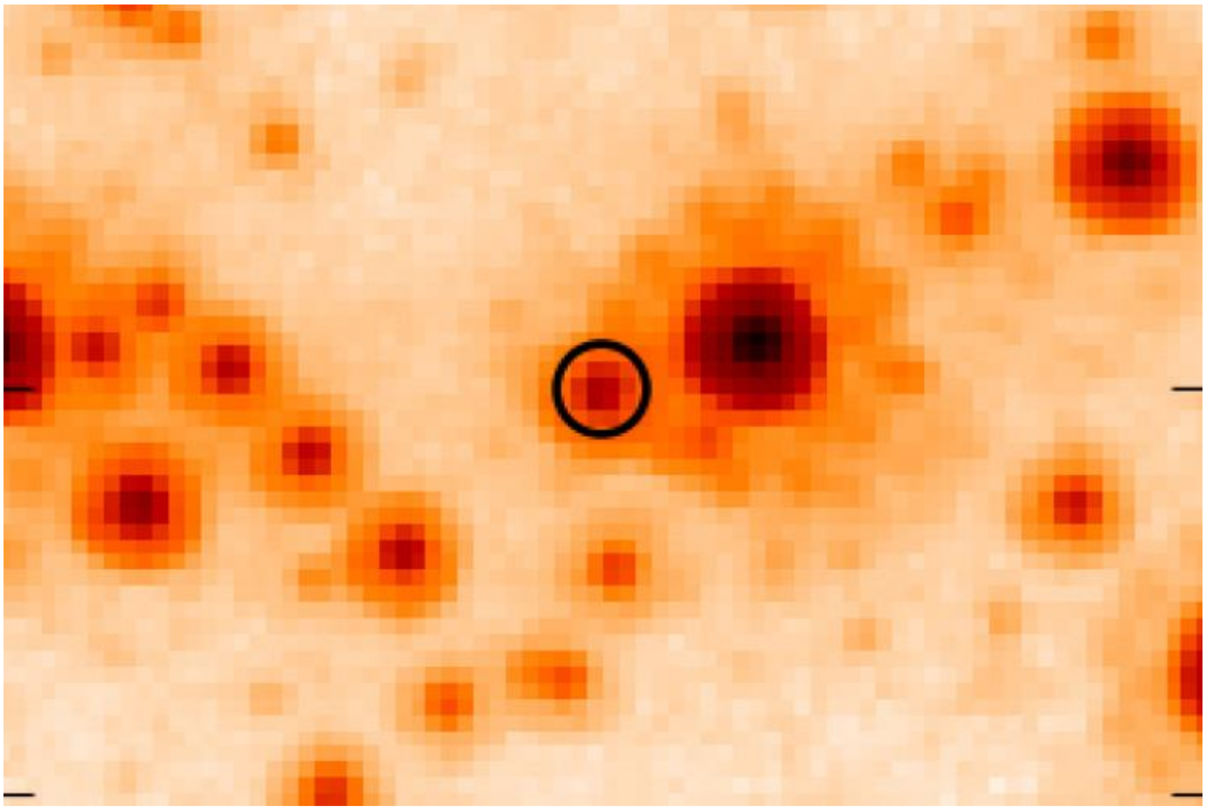
"This is the first free-floating black hole or neutron star discovered with gravitational microlensing," Lu said. "With microlensing, we're able to probe these lonely, compact objects and weigh them. I think we have opened a new window onto these dark objects, which can't be seen any other way."

Determining how many of these compact objects populate the Milky Way galaxy will help astronomers understand the evolution of stars — in particular, how they die — and of our galaxy, and perhaps reveal whether any of the unseen black holes are primordial black holes, which some cosmologists think were produced in large quantities during the Big Bang.

The analysis by Lam, Lu and their international team has been accepted for publication in *The Astrophysical Journal Letters.* The analysis includes four other microlensing events that the team concluded were not caused by a black hole, though two were likely caused by a white dwarf or a neutron star. The team also concluded that the likely population of black holes in the galaxy is 200 million — about what most theorists predicted.

Same data, different conclusions

Notably, a competing team from the Space Telescope Science Institute (STScI) in Baltimore analyzed the same microlensing event and claims that the mass of the compact object is closer to 7.1 solar masses and indisputably a black hole. A paper describing the analysis by the STScI team, led by Kailash Sahu, has been accepted for publication in *The Astrophysical Journal*.



Hubble Space Telescope image of a distant star that was brightened and distorted by an invisible but very compact and heavy object between it and Earth. The compact object — estimated by UC Berkeley astronomers to be between 1.6 and 4.4 times the mass of our sun — could be a free-floating black hole, one of perhaps 200 million in the Milky Way galaxy. (Image courtesy of STScI/NASA/ESA)

Both teams used the same data: photometric measurements of the distant star's brightening as its light was distorted or "lensed" by the super-compact object, and astrometric measurements of the shifting of the distant star's location in the sky as a result of the gravitational distortion by the lensing object. The photometric data came from two microlensing surveys: the Optical Gravitational Lensing Experiment (OGLE), which employs a 1.3-meter telescope in Chile operated by Warsaw University, and the Microlensing Observations in Astrophysics (MOA) experiment, which is mounted on a 1.8-meter telescope in New Zealand operated by Osaka University. The astrometric data came from NASA's Hubble Space Telescope. STScI manages the science program for the telescope and conducts its science operations.

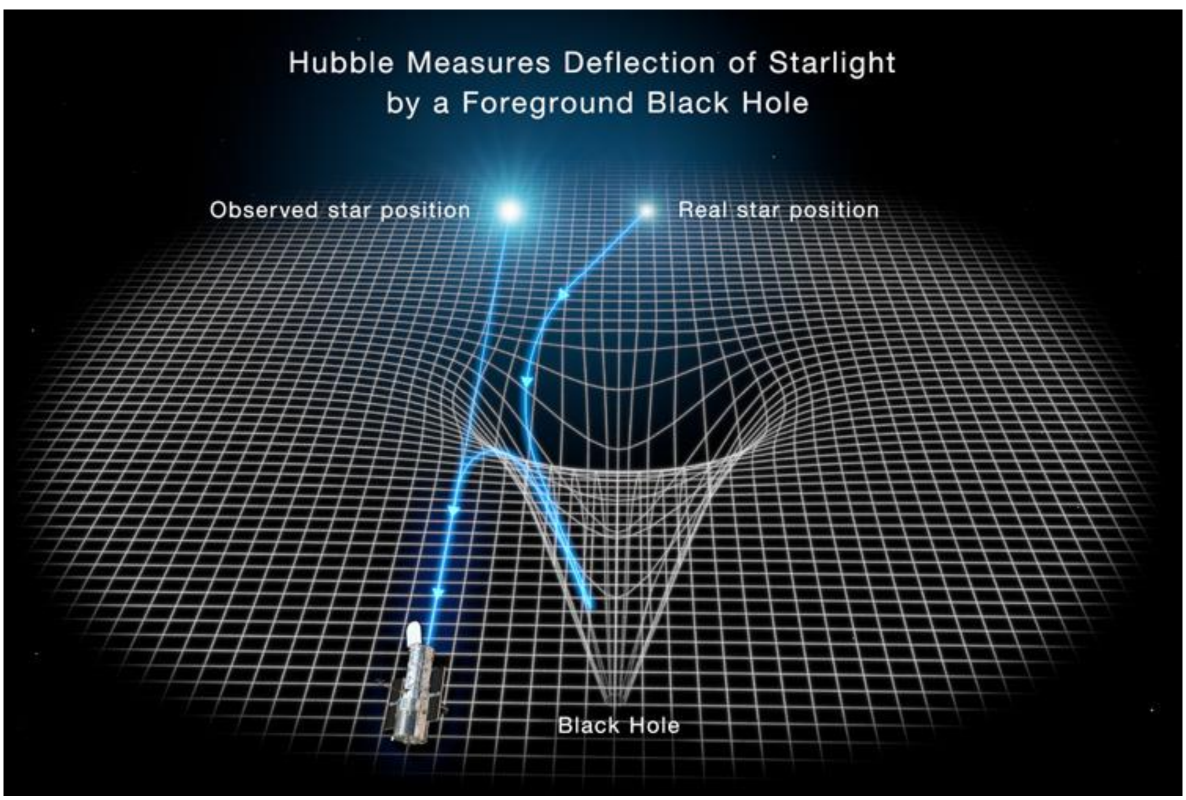
Because both microlensing surveys caught the same object, it has two names: MOA-2011-BLG-191 and OGLE-2011-BLG-0462, or OB110462, for short.

While surveys like these discover about 2,000 stars brightened by microlensing each year in the Milky Way galaxy, the addition of astrometric data is what allowed the two teams to determine the mass of the compact object and its distance from Earth. The UC Berkeley-led team estimated that it lies between 2,280 and 6,260 light years (700-1920 parsecs) away, in the direction of the center of the Milky Way Galaxy and near the large bulge that surrounds the galaxy's central massive black hole.

The STScI group estimated that it lies about 5,153 light years (1,580 parsecs) away.

Looking for a needle in a haystack

Lu and Lam first became interested in the object in 2020 after the STScI team tentatively concluded that five microlensing events observed by Hubble — all of which lasted for more than 100 days, and thus could have been black holes — might not be caused by compact objects after all.



This illustration shows how the gravity of a black hole warps spacetime and bends the light of a distant star so that its position is shifted as seen from Earth. This deflection, captured by the Hubble Space Telescope (left foreground), and the associated brightening of the star allow astronomers to discover these otherwise invisible, free-floating objects and calculate their mass and velocity. (Illustration credit: NASA, ESA, STScI, Joseph Olmsted)

Lu, who has been looking for free-floating black holes since 2008, thought the data would help her better estimate their abundance in the galaxy, which has been roughly estimated at between 10 million and 1 billion. To date, star-sized black holes have been found only as part of binary star systems. Black holes in binaries are seen either in X-rays, produced when material from the star falls onto the black hole, or by recent gravitational wave detectors, which are sensitive to mergers of two or more black holes. But these events are rare.

“Casey and I saw the data and we got really interested. We said, ‘Wow, no black holes. That’s amazing,’ even though there should have been,” Lu said. “And so, we started looking at the data. If there were really no black holes in the data, then this wouldn’t match our model for how many black holes there should be in the Milky Way. Something would have to change in our understanding of black holes — either their number or how fast they move or their masses.”

When Lam analyzed the photometry and astrometry for the five microlensing events, she was surprised that one, OB110462, had the characteristics of a compact object: The lensing object seemed dark, and thus not a star; the stellar brightening lasted a long time, nearly 300 days; and the distortion of the background star’s position also was long-lasting.

The length of the lensing event was the main tipoff, Lam said. In 2020, she showed that the best way to search for black hole microlenses was to look for very long events. Only 1% of detectable microlensing events are likely to be from black holes, she said, so looking at all events would be like searching for a needle in a haystack. But, Lam calculated, about 40% of microlensing events that last more than 120 days are likely to be black holes.

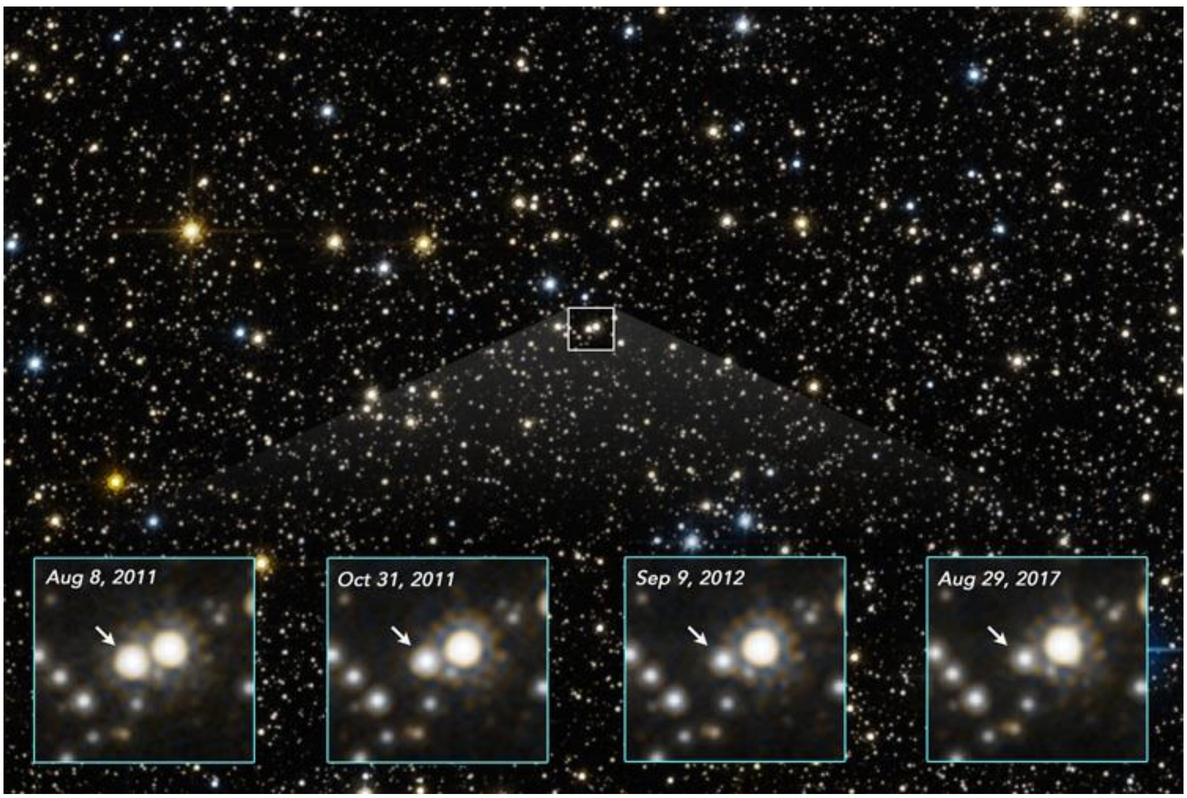
“How long the brightening event lasts is a hint of how massive the foreground lens bending the light of the background star is,” Lam said. “Long events are more likely due to black holes. It’s not a guarantee, though, because the duration of the brightening episode not only depends on how massive the foreground lens is, but also on how fast the foreground lens and background star are moving relative to each other. However, by also getting measurements of the apparent position of the background star, we can confirm whether the foreground lens really is a black hole.”

According to Lu, the gravitational influence of OB110462 on the light of the background star was amazingly long. It took about one year for the star to brighten to its peak in 2011, then about a year to dim back to normal.

More data will distinguish black hole from neutron star

To confirm that OB110462 was caused by a super-compact object, Lu and Lam asked for more astrometric data from Hubble, some of which arrived last October. That new data showed that the change in position of the star as a result of the gravitational field of the lens is still observable 10 years after the event. Further Hubble observations of the microlens are tentatively scheduled for fall 2022.

Analysis of the new data confirmed that OB110462 was likely a black hole or neutron star.



The star-filled sky in this Hubble Space Telescope photo is located in the direction of the galactic center. While monitored the sky in search of stars that dramatically brighten, the telescope discovered one (center) that brightened and dimmed between 2011 and 2017. This may have been caused by a foreground black hole drifting in front of the star, gravitationally brightening it and distorting its position relative to background stars . (Image credit: NASA, ESA, Kailash Sahu(STScI), with image processing by STScI's Joseph DePasquale)

Lu and Lam suspect that the differing conclusions of the two teams are due to the fact that the astrometric and photometric data give different measures of the relative motions of the foreground and background objects. The astrometric analysis also differs between the two teams. The UC Berkeley-led team argues that it is not yet possible to distinguish whether the object is a black hole or a neutron star, but they hope to resolve the discrepancy with more Hubble data and improved analysis in the future.

“As much as we would like to say it is definitively a black hole, we must report all allowed solutions. This includes both lower mass black holes and possibly even a neutron star,” Lu said.

“If you can’t believe the light curve, the brightness, then that says something important. If you don’t believe the position versus time, that tells you something important,” Lam said. “So, if one of them is wrong, we have to understand why. Or the other possibility is that what we measure in both data sets is correct, but our model is incorrect. The photometry and astrometry data arise from the same physical process, which means the brightness and position must be consistent with each other. So, there’s something missing there. ”

Both teams also estimated the velocity of the super-compact lensing object. The Lu/Lam team found a relatively sedate speed, less than 30 kilometers per second. The STScI team found an unusually large velocity, 45 km/s, which it interpreted as the result of an extra kick that the purported black hole got from the supernova that generated it.

Lu interprets her team’s low velocity estimate as potentially supporting a new theory that black holes are not the result of supernovas — the reigning assumption today — but instead come from failed supernovas that don’t make a bright splash in the universe or give the resulting black hole a kick.

The work of Lu and Lam is supported by the National Science Foundation (1909641) and the National Aeronautics and Space Administration (NNG16PJ26C, NASA FINESST 80NSSC21K2043).

RELATED INFORMATION

- An isolated mass gap black hole or neutron star detected with astrometric microlensing (arXiv)
- An isolated stellar-mass black hole detected through astrometric microlensing (arXiv)
- NASA press release
  Jessica Lu’s The Moving Universe Lab