STRATFORD ASTRONOMY GROUP

JANUARY 7TH, 2025

AGENDA

- Meet and Greet
- Club NEWS and Activities
- Club Q & A
- Equipment Lessons
- Software and Imaging Information
- Latest Astronomy NEWS
- What's UP this Month
- Show and Tell
- Astronomy Lessons / Talks
- Cosmology Lessons
- Conclusion

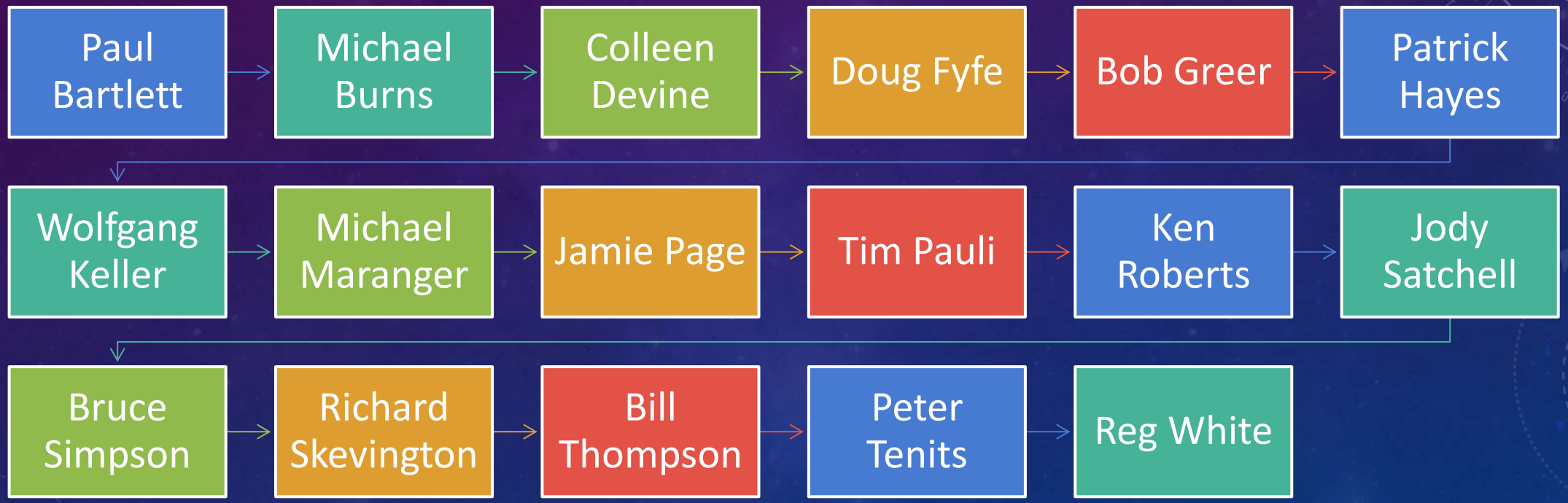
MEET AND GREET

Welcome

New Visitors

Regrets

LAST MEETING



UPCOMING MEETINGS

NEXT MEETING DATES

Date	Room	Location
~~Sept 17th, 2024~~	~~104~~	~~St. Michael's~~
~~Oct 1st, 2024~~	~~104~~	~~St. Michael's~~
~~Nov 5th, 2024~~	~~104~~	~~St. Michael's~~
~~Dec 3rd, 2024~~	~~104~~	~~St. Michael's~~
~~Jan 7th, 2025~~	~~104~~	~~St. Michael's~~
Feb 4th, 2025	104	St. Michael's
March 4th, 2025	104	St. Michael's
April 1st, 2025	104	St. Michael's
May 6th, 2025	104	St. Michael's
June 3rd, 2025	104	St. Michael's

CLUB NEWS AND ACTIVITIES

Group Funds

Total = $1034.85

•If you would like to contribute to the group, then please e-transfer Tim at:

timannemariepauli@gmail.com

or by cheques:

Tim Pauli

96 Front Street

Stratford, ON

N5A4H2

CLUB NEWS AND ACTIVITIES

EQUIPMENT:

STRATFORD ASTRONOMY CLUB EQUIPMENT

CLUB EQUIPMENT LOCATION:

Paul Bartlett is now storing all the group's equipment. If you wish to borrow an item, then please contact him at:

1948paul.bartlett@gmail.com

519-274-2010

New Equipment Donation: Tim

CLUB NEWS AND ACTIVITIES

- New Web site: (https://stratfordastronomy.com/)
  Tim Pauli - Owner/Administrator
  Ken Roberts - technical contact
  Tom Kimber - Administrator/Editor
  Doug Fyfe - Administrator
  Michael Burns- Administrator
  Tom will build it on WordPress.

CLUB Q & A

WHAT'S UP

STRATFORD ASTRONOMY GROUP

WHAT'S UP FOR DECEMBER

<< December | January 2025 | February >>

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	1	2	3	4
			Waxing crescent Visible: 3% ↑ Age: 1.57 days	Waxing crescent Visible: 8% ↑ Age: 2.61 days	Waxing crescent Visible: 15% ↑ Age: 3.66 days	Waxing crescent Visible: 24% ↑ Age: 4.72 days
5	6	7	8	9	10	11
Waxing crescent Visible: 34% ↑ Age: 5.78 days	**First quarter** **Visible: 45% ↑** **Age: 6.85 days**	First quarter Visible: 56% ↑ Age: 7.93 days	Waxing gibbous Visible: 67% ↑ Age: 9.00 days	Waxing gibbous Visible: 78% ↑ Age: 10.08 days	Waxing gibbous Visible: 86% ↑ Age: 11.16 days	Waxing gibbous Visible: 93% ↑ Age: 12.22 days
12	13	14	15	16	17	18
Waxing gibbous Visible: 98% ↑ Age: 13.28 days	**Full moon** **Visible: 100%** **Age: 14.32 days**	Full moon Visible: 100% Age: 15.34 days	Waning gibbous Visible: 98% ↓ Age: 16.33 days	Waning gibbous Visible: 93% ↓ Age: 17.29 days	Waning gibbous Visible: 87% ↓ Age: 18.24 days	Waning gibbous Visible: 80% ↓ Age: 19.16 days
19	20	21	22	23	24	25
Waning gibbous Visible: 72% ↓ Age: 20.06 days	Last quarter Visible: 63% ↓ Age: 20.95 days	**Last quarter** **Visible: 54% ↓** **Age: 21.84 days**	Last quarter Visible: 44% ↓ Age: 22.72 days	Last quarter Visible: 35% ↓ Age: 23.62 days	Waning crescent Visible: 26% ↓ Age: 24.53 days	Waning crescent Visible: 18% ↓ Age: 25.46 days
26	27	28	29	30	31	1
Waning crescent Visible: 11% ↓ Age: 26.42 days	Waning crescent Visible: 5% ↓ Age: 27.41 days	New Visible: 2% ↓ Age: 28.43 days	**New** **Visible: 1% ↓** **Age: 29.48 days**	New Visible: 2% ↑ Age: 1.02 days	Waxing crescent Visible: 5% ↑ Age: 2.11 days	

HEY, THERE BE A MOON OVERHEAD

MOON PHASES FOR THE MONTH OF JANUARY

« JANUARY 2025 (LET'S USE THE MOON) »

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 The cluster Messier 41 is well placed	2 Asteroid 14 Irene at opposition	3 Conjunction of the Moon and Venus Quadrantid meteor shower 2025 Close approach of the Moon and Venus	4 The Earth at perihelion Close approach of the Moon and Saturn Lunar occultation of Saturn Conjunction of the Moon and Saturn
5 Lunar occultation of Neptune	6 Moon at First Quarter	7 The Moon at perigee	8	9 Close approach of the Moon and M45	10 Venus at greatest elongation east Close approach of the Moon and Jupiter Conjunction of the Moon and Jupiter	11 Lunar occultation of Beta Tauri Venus at dichotomy
12 Mars at perigee	13 Asteroid 887 Alinda at opposition Comet C/2024 G3 (ATLAS) passes perigee Comet C/2024 G3 (ATLAS) passes perihelion Full Moon Conjunction of the Moon and Mars Close approach of the Moon and Mars Lunar occultation of Mars	14 The Moon at aphelion The cluster Messier 47 is well placed NGC 2403 is well placed	15 Mars at opposition	16 The cluster NGC 2451 is well placed	17	18 Close approach of Venus and Saturn
19 γ-Ursae Minorid meteor shower 2025 Mercury at aphelion	20 Conjunction of Venus and Saturn The cluster NGC 2516 is well placed Lunar occultation of Spica The Moon at apogee	21 134340 Pluto at solar conjunction Moon at Last Quarter	22	23 The cluster NGC 2547 is well placed	24 Lunar occultation of Antares	25
26	27	28 The Moon at perihelion	29 New Moon	30 Uranus ends retrograde motion The Beehive cluster is well placed The Omicron Velorum cluster is well placed	31 The cluster IC 2395 is well placed Close approach of the Moon and Saturn Lunar occultation of Saturn Conjunction of the Moon and Saturn	

MOON AND M45
THU, 09 JAN 2025 AT 20:39 EST (01:39 UTC)

- The Moon and M45 will make a close approach, passing within a mere 19.2 arcminutes of each other. The Moon will be 11 days old.

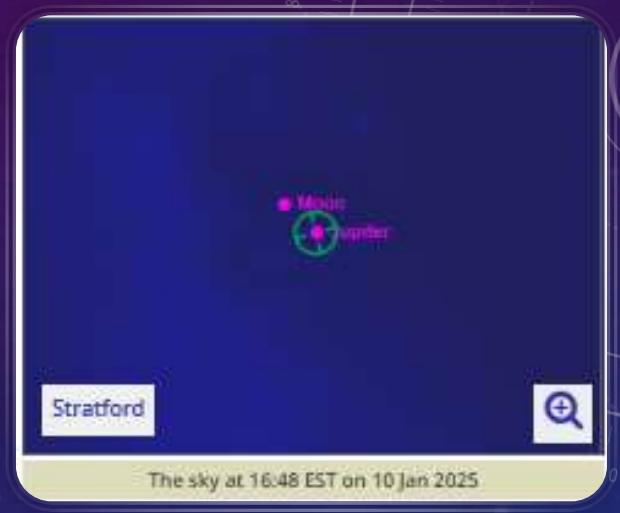
- From Stratford , the pair will be visible in the evening sky, becoming accessible around 17:53 (EST), 48° above your eastern horizon, as dusk fades to darkness. They will then reach their highest point in the sky at 20:51, 70° above your southern horizon. They will continue to be observable until around 03:13, when they sink below 12° above your western horizon.

- The Moon will be at mag -12.5; and M45 will be at mag 1.3. Both objects will lie in the constellation Taurus.

- They will be close enough to fit within the field of view of a telescope, but will also be visible to the naked eye or through a pair of binoculars.

CLOSE APPROACH OF THE MOON AND JUPITER

FRI, 10 JAN 2025 AT 16:45 EST (21:45 UTC)



- The Moon and Jupiter will make a close approach, passing within 5°21' of each other. The Moon will be 11 days old.

- From Stratford , the pair will be visible in the evening sky, becoming accessible around 17:26 (EST), 33° above your eastern horizon, as dusk fades to darkness. They will then reach their highest point in the sky at 21:42, 68° above your southern horizon. They will continue to be observable until around 04:21, when they sink below 7° above your western horizon.

- The Moon will be at mag -12.6; and Jupiter will be at mag -2.7. Both objects will lie in the constellation Taurus.

- They will be too widely separated to fit within the field of view of a telescope or pair of binoculars, but will be visible to the naked eye.

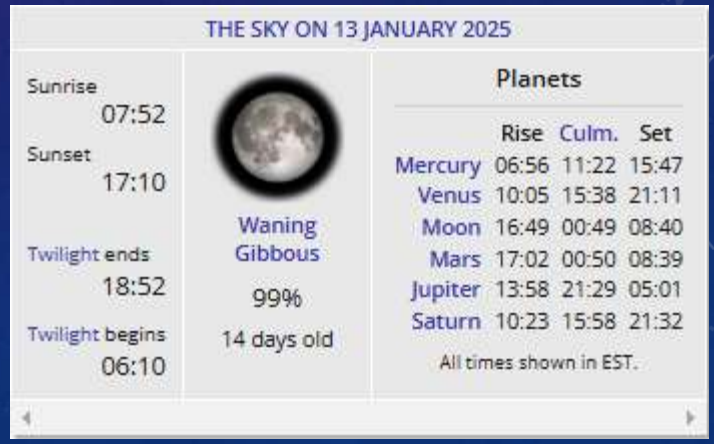
- At around the same time, the pair will also share the same right ascension – called a conjunction.

LUNAR OCCULTATION OF MARS

Start: Mon, 13 Jan 2025 at 20:44 EST (01:44 UTC)
End: Tue, 14 Jan 2025 at 00:52 EST (05:52 UTC)

The Moon will pass in front of Mars, creating a lunar occultation visible from the Americas and Africa. Although the occultation will only be visible across part of the world – because the Moon is so close to the Earth that its position in the sky varies by as much as two degrees across the world – a close conjunction between the pair will be more widely visible.

The occultation will be visible from Stratford. It will begin with the disappearance of Mars behind the Moon at 21:15 EST in the eastern sky at an altitude of 43.4 degrees. Its reappearance will be visible at 22:27 EST at an altitude of 56.2 degrees.



Close of the Moon and Saturn

THIS EVENT IS EASILY VISIBLE THROUGH NAKED EYE FROM STRATFORD.

FRI, 31 JAN 2025 AT 23:01 EST (04:01 UTC)

The Moon and Saturn will make a close approach, passing within a mere 57.6 arcminutes of each other. From some parts of the world, the Moon will pass in front of Saturn, creating a lunar occultation. The Moon will be 3 days old.

From Stratford , the pair will become visible at around 18:15 (EST), 22° above your south-western horizon, as dusk fades to darkness. They will then sink towards the horizon, setting 2 hours and 58 minutes after the Sun at 20:31.

The Moon will be at mag -10.2; and Saturn will be at mag 1.0. Both objects will lie in the constellation Aquarius.

They will be a little too widely separated to fit comfortably within the field of view of a telescope, but will be visible to the naked eye or through a pair of binoculars.

At around the same time, the pair will also share the same right ascension – called a conjunction.

THE SKY ON 31 JANUARY 2025

Sunrise	07:38
Sunset	17:33
Twilight ends	19:12
Twilight begins	06:00

Waxing Crescent

12%

2 days old

Planets

	Rise	Culm.	Set
Mercury	07:33	12:12	16:52
Venus	09:19	15:24	21:29
Moon	09:06	14:33	20:14
Mars	15:13	23:07	07:01
Jupiter	12:44	20:15	03:47
Saturn	09:17	14:53	20:30

All times shown in EST.

LATEST ASTRONOMY NEWS

DECEMBER

JWST UNCOVERS MASSIVE GRAND-DESIGN SPIRAL GALAXY IN EARLY UNIVERSE - DEC 6TH

•Indian astronomers report the detection of a new grand-design galaxy with the James Webb Space Telescope (JWST). The newfound galaxy, which received designation A2744-GDSp-z4, is relatively large and massive. The finding was detailed in a paper published Dec. 6 on the pre-print server *arXiv*.

•Grand-design spiral galaxies are characterized by their prominent, well-defined arms, which circle outwards from a clear core. It is assumed that the arms in such galaxies are actually overdense regions of the disk which trigger star formation as incoming material is compressed in that region.

•It is still not well understood when and how spiral galaxies first emerged in the early universe and such galaxies are generally rare at high redshifts. To date, only a few individual spirals have been found at a redshift higher than 3.0 (this one has z~4).

•The astronomers calculated that the onset of star formation in A2744-GDSp-z4 occurred approximately 839 million years after the Big Bang. Therefore, this means that A2744-GDSp-z4 assembled a mass of 10 billion solar masses in a few hundred million years and the age of the universe at the galaxy's redshift was only about 1.5 billion years.

•The authors of the paper underlined that these findings challenge the current hierarchical models of galaxy formation and leave many questions open.

WEBB FINDS PLANET-FORMING DISKS LIVED LONGER IN EARLY UNIVERSE – DEC 16TH

- The NASA/ESA/CSA James Webb Space Telescope just solved a conundrum by proving a controversial finding made with the NASA/ESA Hubble Space Telescope more than 20 years ago.
- In 2003, Hubble provided evidence of a massive planet around a very old star, almost as old as the universe. Such stars possess only small amounts of heavier elements that are the building blocks of planets. This implied that some planet formation happened when our universe was very young, and those planets had time to form and grow big inside their primordial disks, even bigger than Jupiter. But how? This was puzzling.
- To answer this question, researchers used Webb to study stars in a nearby galaxy that, much like the early universe, lacks large amounts of heavy elements. They found that not only do some stars there have planet-forming disks, but that those disks are longer-lived than those seen around young stars in our Milky Way galaxy. The work is published in *The Astrophysical Journal*.

FIRST-EVER BINARY STAR FOUND NEAR OUR GALAXY'S SUPERMASSIVE BLACK HOLE – DEC 17TH

•An international team of researchers has detected a binary star orbiting close to Sagittarius A*, the supermassive black hole at the center of our galaxy. It is the first time a stellar pair has been found in the vicinity of a supermassive black hole.

•The discovery, based on data collected by the European Southern Observatory's Very Large Telescope (ESO's VLT), helps us understand how stars survive in environments with extreme gravity, and could pave the way for the detection of planets close to Sagittarius A*.

•"Black holes are not as destructive as we thought," says Florian Peißker, a researcher at the University of Cologne, Germany, and lead author of the study published in *Nature Communications*.

•Binary stars, pairs of stars orbiting each other, are very common in the universe, but they had never before been found near a supermassive black hole, where the intense gravity can make stellar systems unstable.

EVENT HORIZON TELESCOPE: MOVING TOWARDS A CLOSE-UP OF A BLACK HOLE AND ITS JETS- DEC 17TH

•After taking the first images of black holes, the Event Horizon Telescope (EHT) is poised to reveal how black holes launch powerful jets into space.

•Now, a research team led by Anne-Kathrin Baczko from Chalmers University of Technology in Sweden has shown that the EHT will be able to make exciting images of a supermassive black hole and its jets in the galaxy NGC 1052. The measurements, made with interconnected radio telescopes, also confirm strong magnetic fields close to the black hole's edge.

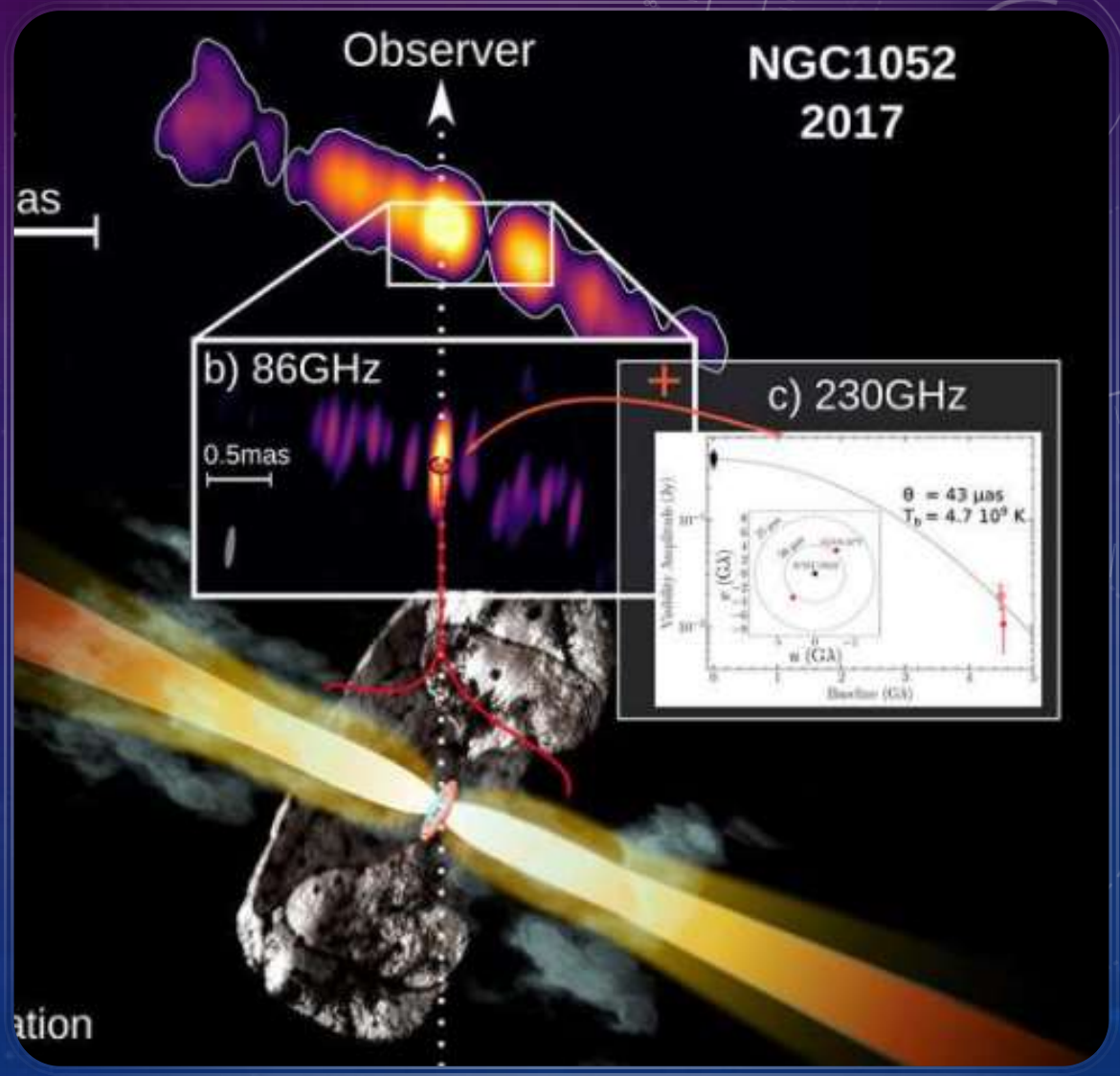
•The main research question for the project's scientists was how do supermassive black holes launch galaxy-size streams of high-energy particles—known as jets—into space at almost light-speed? Now, scientists have taken an important step towards being able to answer this question, with intricate measurements of the center of the galaxy NGC 1052, at a distance of 60 million light years from Earth.

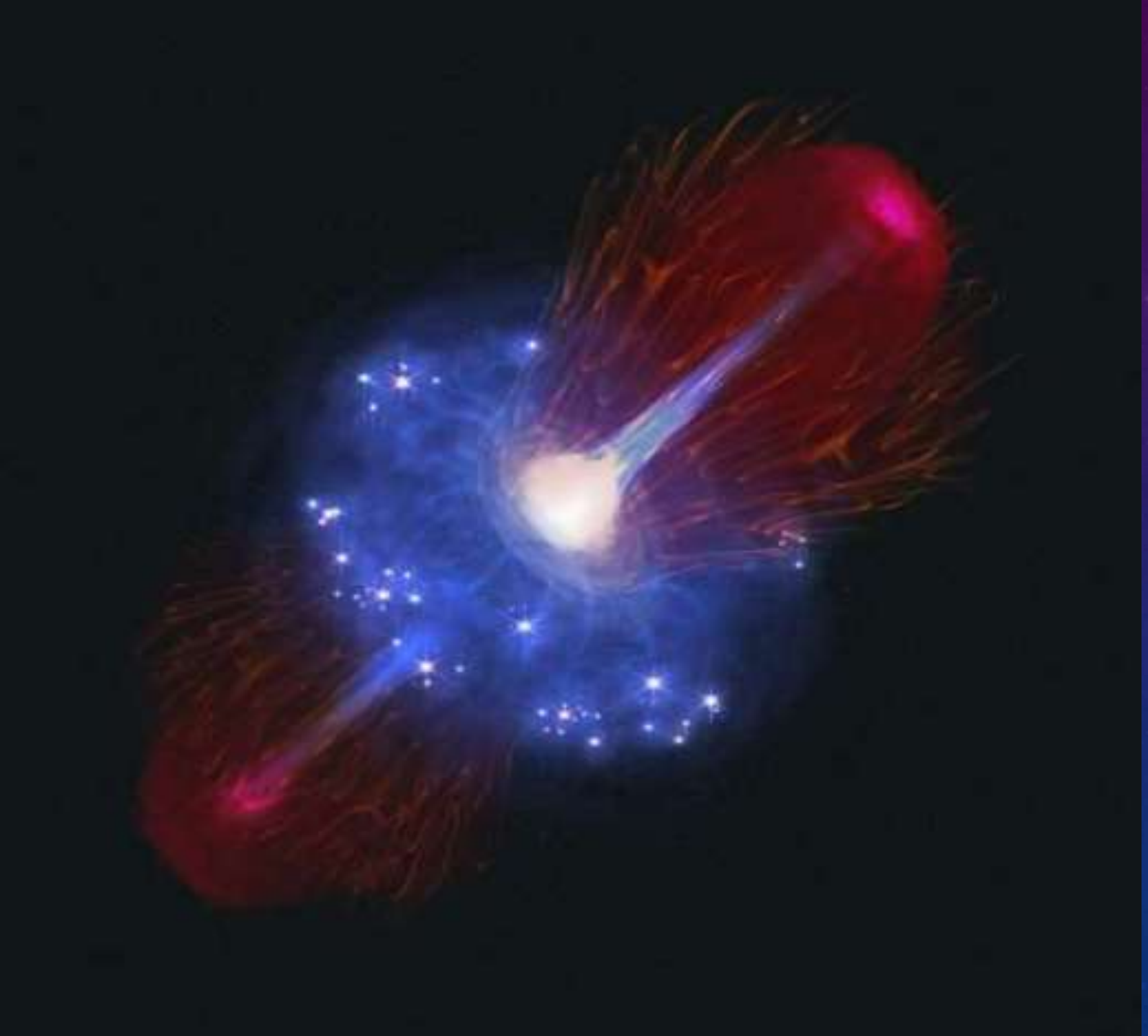
•The scientists made coordinated measurements using several radio telescopes, providing new insights into the workings of a galaxy and its supermassive black hole. The results are reported in a paper titled "The putative center in NGC 1052" published in the journal *Astronomy & Astrophysics* on 17 December 2024.

•The measurements were made by five telescopes in the EHT network: ALMA (the Atacama Large Millimeter/submillimeter Array) in Chile, the IRAM 30-meter telescope in Spain; the James Clerk Maxwell Telescope (JCMT) and the Submillimeter Array (SMA) in Hawaii; and the South Pole Telescope (SPT) in Antarctica.

•These were supplemented with measurements from 14 other radio telescopes in the GMVA network (Global Millimeter VLBI Array), in Spain, Finland and Germany, including the 20-meter telescope at Onsala Space Observatory, Sweden, and the telescopes of the VLBA (Very Long Baseline Array) in the US.

•The EHT Collaboration involves more than 400 researchers from Africa, Asia, Europe, North and South America. The international collaboration aims to capture the most detailed black hole images ever obtained by creating a virtual Earth-sized telescope.





DORMANT MASSIVE BLACK HOLE IN THE EARLY UNIVERSE CHALLENGES EXISTING MODELS-DEC 18TH

- Scientists have spotted a massive black hole in the early universe that is "napping" after stuffing itself with too much food. Like a bear gorging itself on salmon before hibernating for the winter, or a much-needed nap after Christmas dinner, this black hole has overeaten to the point that it is lying dormant in its host galaxy.
- An international team of astronomers, led by the University of Cambridge, used the NASA/ESA/CSA James Webb Space Telescope to detect this black hole in the early universe, just 800 million years after the Big Bang.
- The black hole is huge—400 million times the mass of our sun—making it one of the most massive black holes discovered by Webb at this point in the universe's development. The black hole is so enormous that it makes up roughly 40% of the total mass of its host galaxy: in comparison, most black holes in the local universe are roughly 0.1% of their host galaxy mass.
- However, despite its gigantic size, this black hole is eating, or accreting, the gas it needs to grow at a very low rate—about 100 times below its theoretical maximum limit—making it essentially dormant.

LATEST WEBB/HUBBLE IMAGES

HUBBLE IMAGES SPIRAL GALAXY NGC 5643 – DEC 16TH

- The spiral galaxy NGC 5643 is located roughly 40 million light-years away in the constellation Lupus, the Wolf. NGC 5643 is a grand design spiral, which refers to the galaxy's symmetrical form with two large, winding spiral arms that are clearly visible. Bright-blue stars define the galaxy's spiral arms, along with lacy reddish-brown dust clouds and pink star-forming regions.
- As fascinating as the galaxy appears at visible wavelengths, some of NGC 5643's most interesting features are invisible to the human eye.
- Ultraviolet and X-ray images and spectra of NGC 5643 show that the galaxy hosts an active galactic nucleus: an especially bright galactic core powered by a feasting supermassive black hole.

HUBBLE SPIES SPIRAL GALAXY NGC 2566 –DEC 23RD

•This NASA/ESA Hubble Space Telescope image features the spiral galaxy NGC 2566, which sits 76 million light-years away in the constellation Puppis. A prominent bar of stars stretches across the center of this galaxy, and spiral arms emerge from each end of the bar. Because NGC 2566 appears tilted from our perspective, its disk takes on an almond shape, giving the galaxy the appearance of a cosmic eye.

DARK ENERGY CAMERA CAPTURES THOUSANDS OF GALAXIES IN STUNNING IMAGE

•Astronomers have captured a breathtaking new image of thousands of galaxies, thanks to the Dark Energy Camera (DECam) mounted on the U.S. National Science Foundation's Víctor M. Blanco 4-meter Telescope at Cerro Tololo Inter-American Observatory in Chile.

•Focused on the Antlia Cluster — a dense assembly of galaxies within the Hydra–Centaurus Supercluster located around 130 million light-years from Earth — the image captures only a small portion of the 230 galaxies that make up the cluster, revealing a diverse array of galaxy types within as well as thousands of background galaxies beyond.

SHOW AND TELL

COSMOLOGY TALK