Lewes Astronomical Society

Newsletter - January 2023

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Astronomy & Space News

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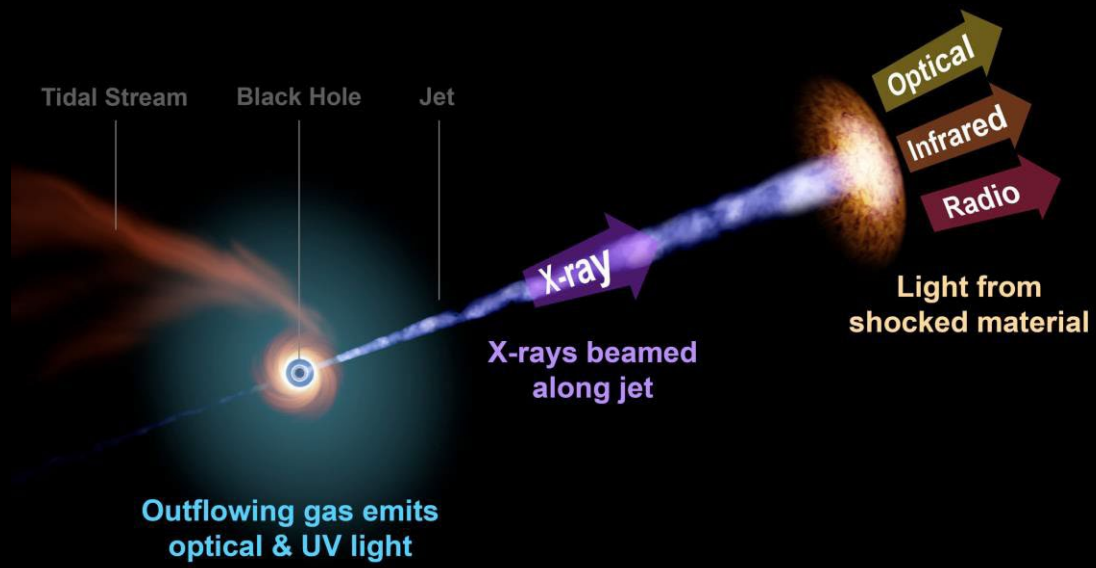
Black Hole Jet

- A black hole, 8.5 billion light years away, has blasted a jet of matter towards the Earth
- Travelling at almost the speed of light, the tidal disruption event (TDE), named AT2022cmc, is over 100 times more powerful than any other detected Gamma Ray Burst (GRB)
- The probable cause is the supermassive black hole tearing a nearby star apart and feeding on it



Credit: Zwicky Transient Facility/R. Hunt (Caltech/IPAC)

- You can watch an animation of black hole jets at: https://www.youtube.com/watch?v=MQHdSbxuznY

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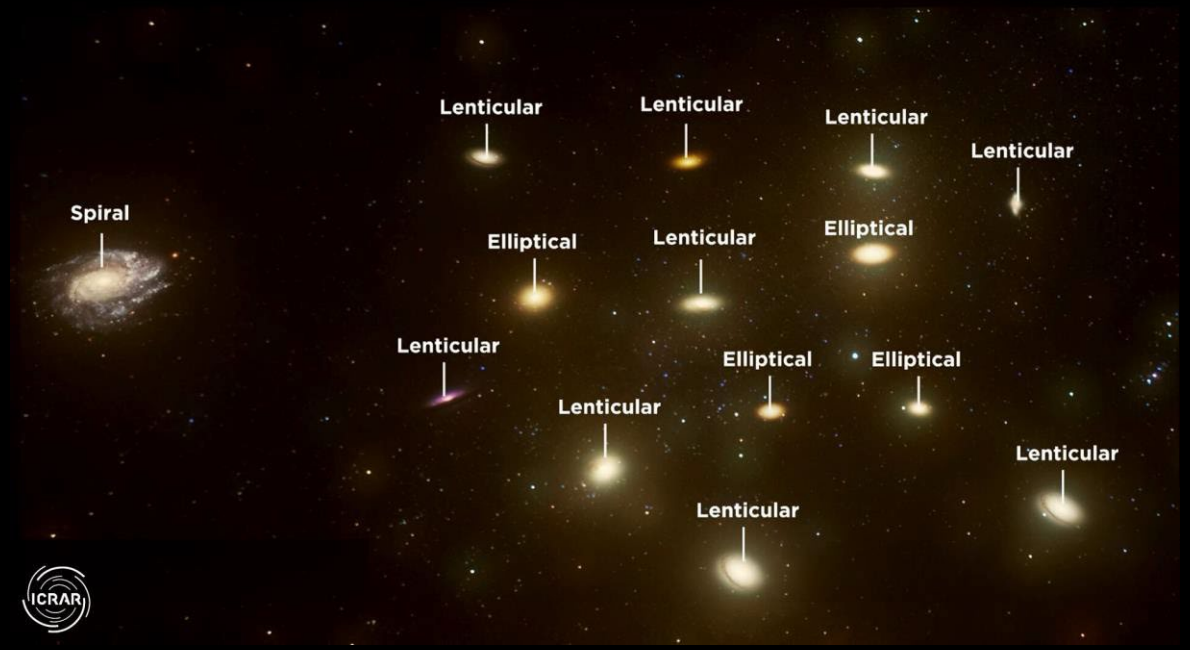
Galaxy evolution

- Why are some galaxies spiral, others elliptical and others lenticular?
- This question has puzzled astronomers for 100 years
- Past observations have noted that spiral galaxies (like the Milky Way and Andromeda) tend to be loners whereas elliptical and lenticular galaxies tend to be in clusters
- New research suggests that the arms of spiral galaxies are fragile, and the stronger gravitational field in a cluster strips them of gas, hence they collapse



Credit: ICRAR

- Spiral galaxy collisions also disrupt the arms and they tend to form elliptical galaxies afterwards
- Watch the video at: https://vimeo.com/781742515?embedded=true&source=video_title&owner=4994054

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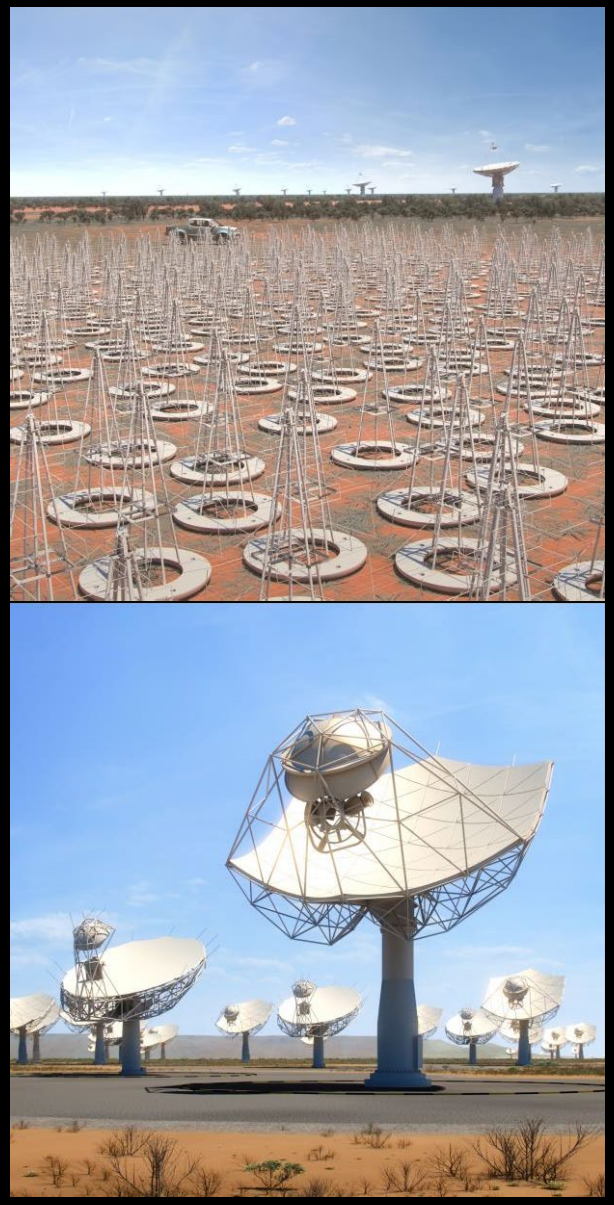
World’s largest radio telescope

- Construction has started on the Square Kilometre Array (SKA) low frequency facility in the Murchison Outback of Western Australia
- 512 stations will be constructed over 74 square kilometres. Each station will have 256 wide-band dipole antennas tuned to low frequency radio waves between 50 and 350MHz. In total there will be 131,072 antennas
- In South Africa the focus is on mid-frequency radio waves (between 350MHz and 15GHz). The existing 64 radio dishes of the MeerKAT facility in the Karoo Desert will be enhanced and expanded to 197 dishes
- Radio waves of these frequencies will help in the study of the early universe and its current structure

Artists impression of the SKA-low (top) and SKA-medium (bottom) observatories
Credit: SKAO – CC BY 3.0)



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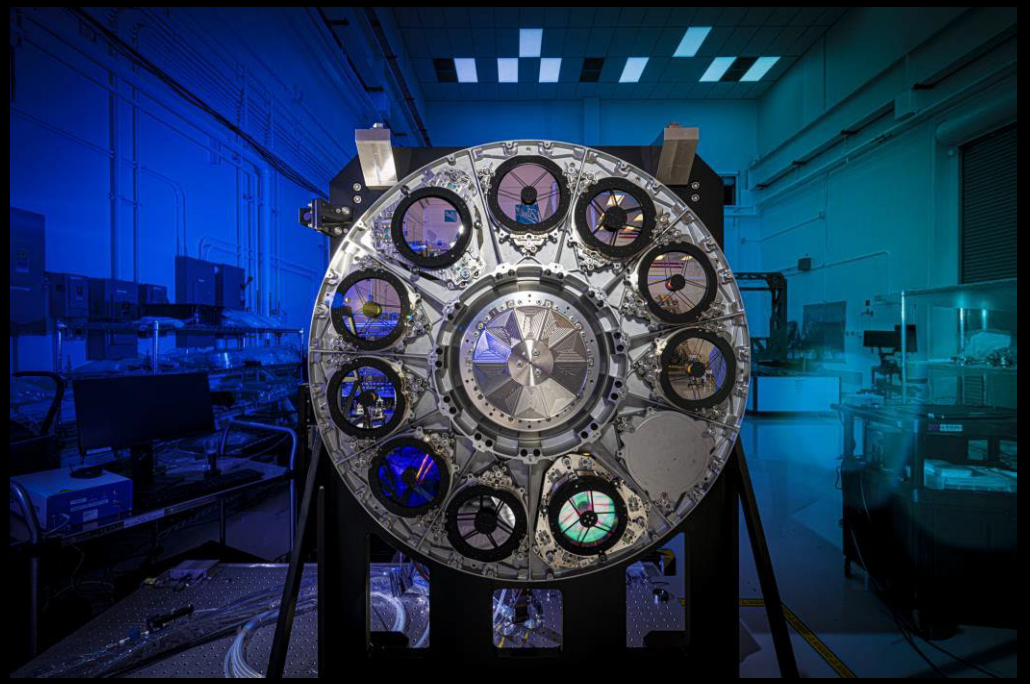
Nancy Grace Roman Space Telescope construction progressing



Credit: Bell Aerospace

- NASA’s new flagship infrared space telescope, the Nancy Grace Roman, is due to be launched in May 2027. Its mission will focus on dark energy and matter. It will also image exoplanets
- Although the main part of the telescope has yet to be built, Bell Aerospace has delivered the Element Wheel Assembly
- This features 8 science filters (for selecting specific wavelengths of light), 2 dispersive elements (a grism and a prism which are spectroscopic tools), and a blank element for internal calibration

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Perseverance caches first sample on Martian surface

Credit: NASA/JPL-Caltech/MSSS

- The first of ten samples to be deposited at the “Three Forks” location was left by the Perseverance Rover on December 21st 2022
- The sample is a duplicate of one stored on board the rover which, hopefully, will then be passed over to the robotic lander to be placed with other samples (17 so far) in a containment capsule on a small rocket. This rocket will then rendezvous with another spacecraft in orbit for the return trip to Earth
- Failing this, Sample Recovery Helicopters are planned to recover the cached samples from the Martian surface

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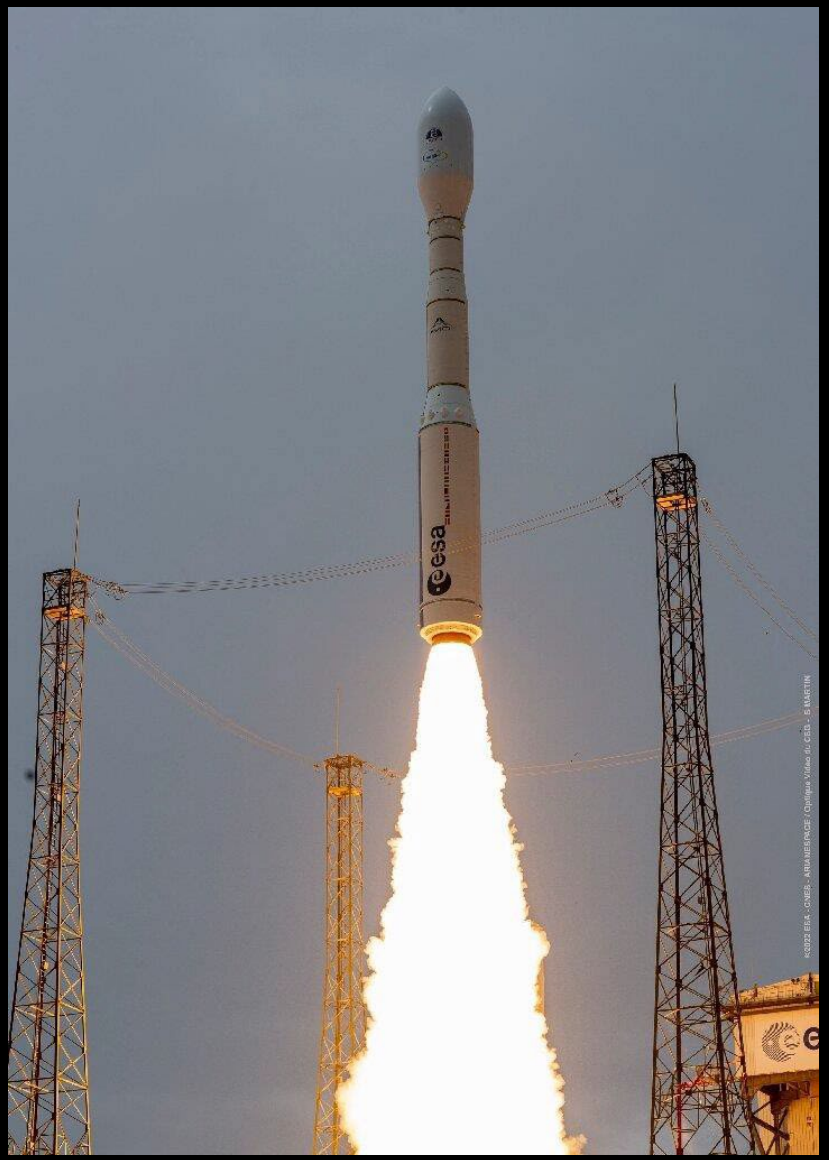
New European rocket lost shortly after take-off

- The new Vega-C rocket was lost shortly after launch from the French Guinea European Spaceport on Wednesday 14th December
- Two satellites were also destroyed
- A second stage failure, when the rocket had reached an altitude of 100km, caused it to crash into the Atlantic Ocean
- European launches are now compromised with the late delivery of the next larger rocket (Ariane 6) and with Russia having suspended cooperation



The Vega-C launch on 14th December 2022

Credit: ESA

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Update from last month 1 – Artemis I

- The Orion Space Capsule landed safely in the Pacific Ocean on Sunday 11th December
- It was the fastest ever re-entry. The capsule hit the atmosphere at 24,464mph (Mach 32)
- It appears to be undamaged but further checks will be carried out over the next few weeks
- The four crew members of the Artemis II mission will be named in early 2023
- Launch of Artemis II is due in 2024

Sailors from the USS Portland recover the Orion Space Capsule from the Pacific Ocean

Credit: Mario Tama/Pool photo via AP

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Update from last month 2 – InSight Probe

- Shortly after the Insight Probe sent this image from Mars all communication with it was lost
- Power levels over the past few weeks have dropped dramatically as further dust deposits covered the solar panels
- NASA officially terminated the mission on Monday 19th December
- One of the last signals sent was a sound recording of a dust-devil passing overhead

Last image from NASA's InSight Lander

Credit: NASA via AP

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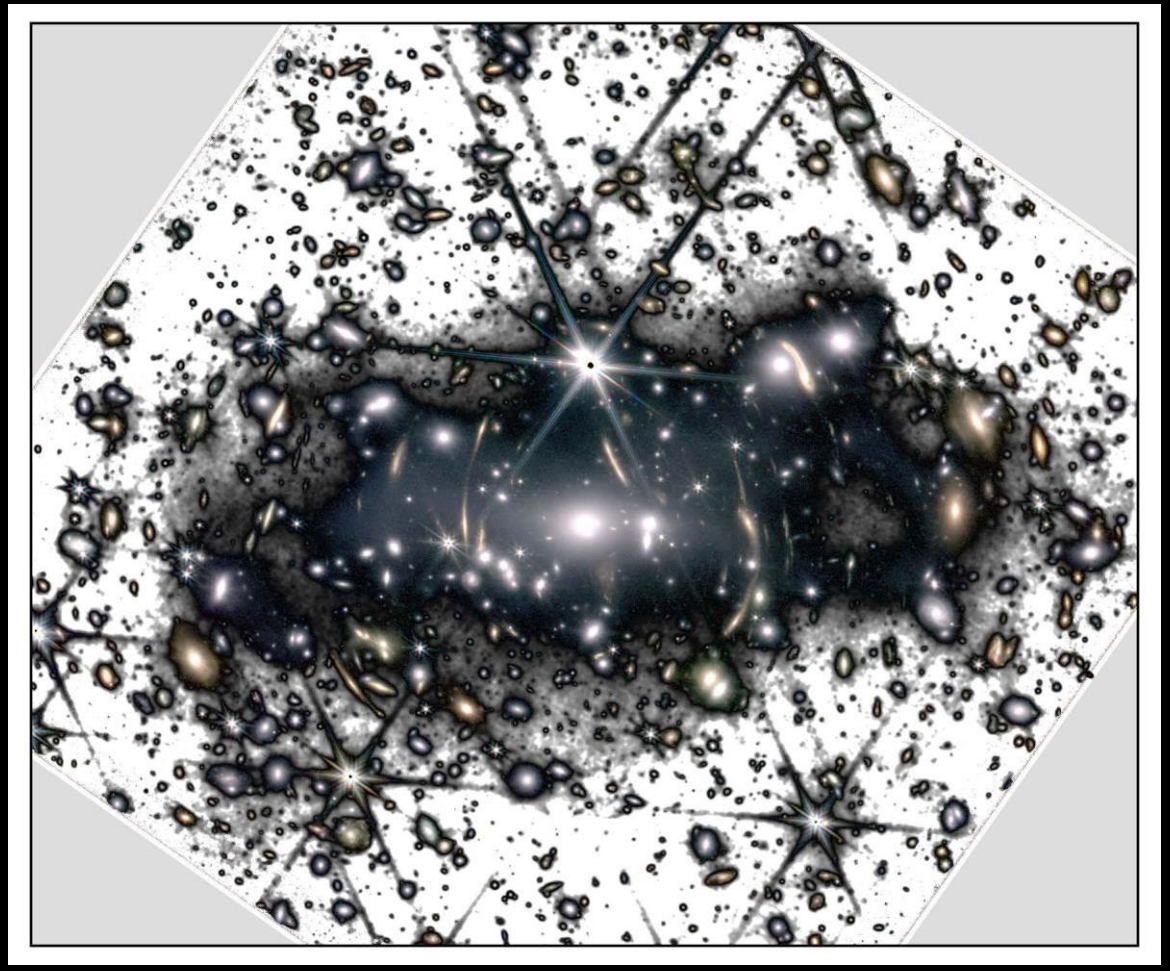
JWST and Hubble latest photos 1

- In clusters of galaxies some stars are pulled out and wander through intergalactic space. Tidal forces that are generated by the galaxies are responsible for stars being disrupted
- The light emitted by these stars, called intracluster light (ICL), is very faint
- JWST has imaged the ICL from SMACS-J0723.3-7327 with an unprecedented level of detail



Credit: NASA, ESA, CSA, STScI

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JWST and Hubble latest photos 2

- Hubble has captured the Globular Cluster NGC6440 in superb detail
- The Cluster is 28,000 light years away in Sagittarius
- Containing up to 1 million stars which average less than 1 light year apart, it is roughly spherical

Credit: NASA, ESA, C. Pallanca and F. Ferraro (Universits Di Bologna), and M. van Kerkwijk (University of Toronto); Processing: G. Kober (NASA/Catholic University of Americ

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JWST and Hubble latest photos 3

- Hubble has recently been studying the Large Magellanic Cloud
- This is the Open Cluster, BSDL 2757
- The blue-white light from stars shines through the reddie-hued gas and dust
- It is situated in the constellation of Dorado approximately 160,000 light years distant

Credit: NASA, ESA, and L. Bianchi (Johns Hopkins University);
Processing: G. Kober (NASA/Catholic University of America)

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JWST and Hubble latest photos 4

- NGC 1858 is another open cluster in the Large Magellanic Cloud. It is known as an emission nebula
- A relatively young cluster probably no older than 10 million years
- This Hubble image shows radiation from newly-formed stars blasting the surrounding gas and ionizing the hydrogen atoms so they glow in ultraviolet light

Credit: NASA, ESA and G. Gilmore (University of Cambridge); Processing: Gladys Kober (NASA/Catholic University of America)

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JWST and Hubble latest photos 5

- Another open cluster seen by Hubble in the Large Magellanic Cloud is KMHK 1231
- The cluster is surrounded by a large cloud of gas and dust
- This is glowing in orange (visible light) and red (near infra-red)
- Over the next few million years the cluster will probably disperse and individual stars be absorbed into our galaxy

Credit: NASA, ESA, and L. Bianchi (Johns Hopkins University);
Processing: Gladys Kober (NASA/Catholic University of America)

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JWST and Hubble latest photos 6

- This tiny galaxy, nicknamed Peekaboo (HIPASS J-1131-31) has been hidden behind (and right of) a fast-moving star, TYC 7215-199-1
- It is a primitive galaxy made up of primordial hydrogen and helium and classified as extremely metal poor
- It is only 20 million light years away
- Although appearing to be an ancient galaxy, analysis of 60 stars shows it is less than 1 billion years old

Credit: : NASA, ESA, and Igor Karachentsev (SAO RAS);
Image Processing: Alyssa Pagan (STScI)

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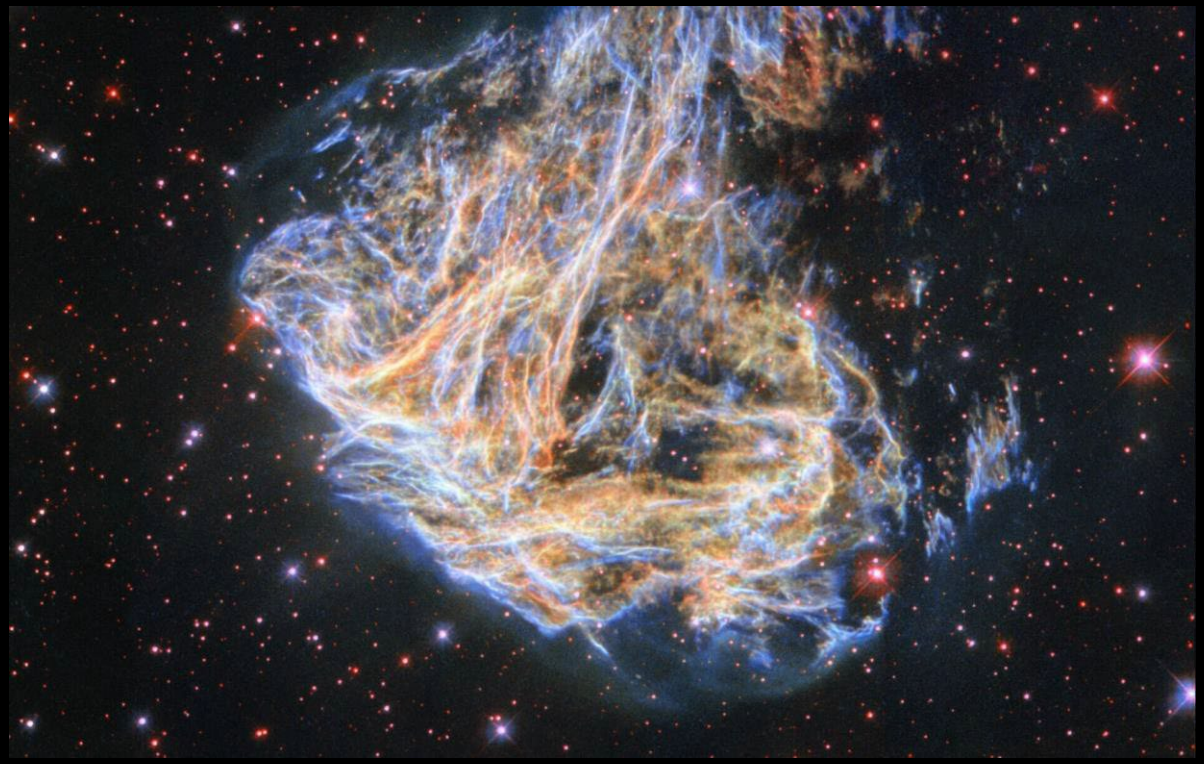
JWST and Hubble latest photos 7

- The supernova remnant N49 was imaged by Hubble between November 1998 and July 2000
- Pictures of it were first released in 2003 and 2006
- Much more data was captured than originally used but new improved data imaging techniques have now allowed the fine detail to be revealed



Credit: ESA/Hubble & NASA, S. Kulkarni, Y. Chu

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JWST and Hubble latest photos 8

- The JWST image of the Southern Ring Nebula reveals two hidden stars at the heart of the nebula. The fainter of the two is the white dwarf which shed the gas and dust in its death throes (and hence the nebula); the larger is the companion star in the binary system
- Two other faint stars have also been identified situated very close to the centre

Credit: NASA, ESA, CSU, T. Treu (UCLA)

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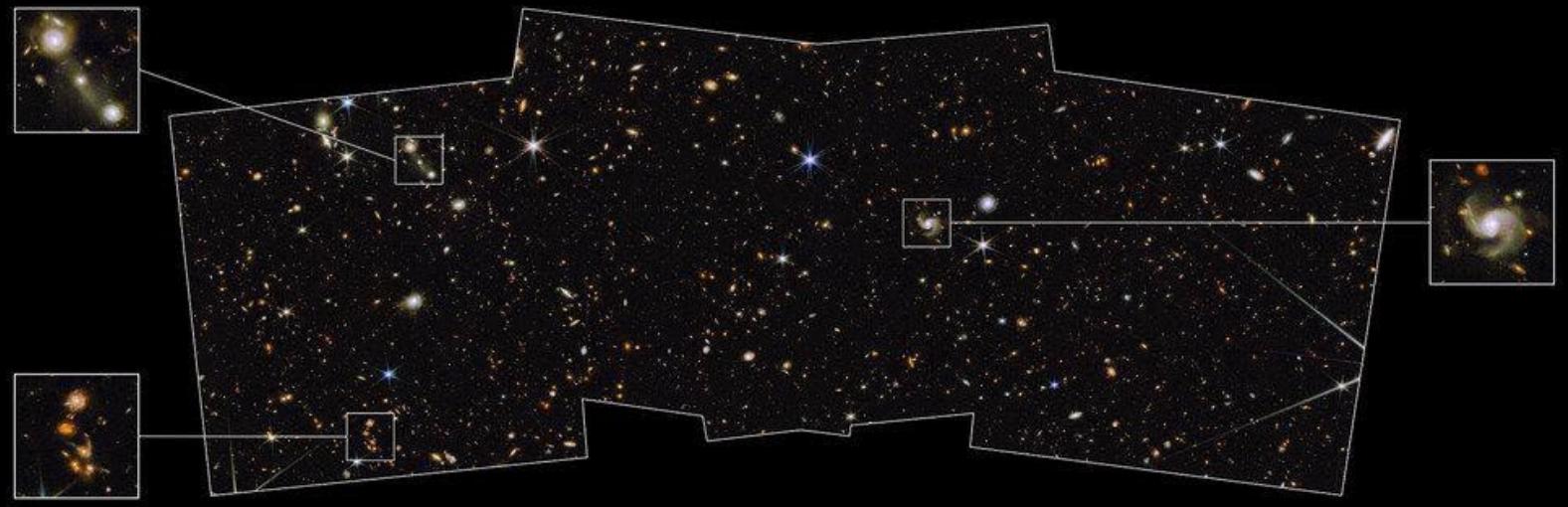
JWST and Hubble latest photos 9

- JWST has captured one of the first medium-deep wide-field images of the cosmos, featuring a region of the sky known as the North Ecliptic Pole
- Thousands of galaxies over an enormous range in distance and time are seen in exquisite detail



Credit: NASA, ESA, CSA, A. Pagan (STScI) & R. Jansen (ASU)

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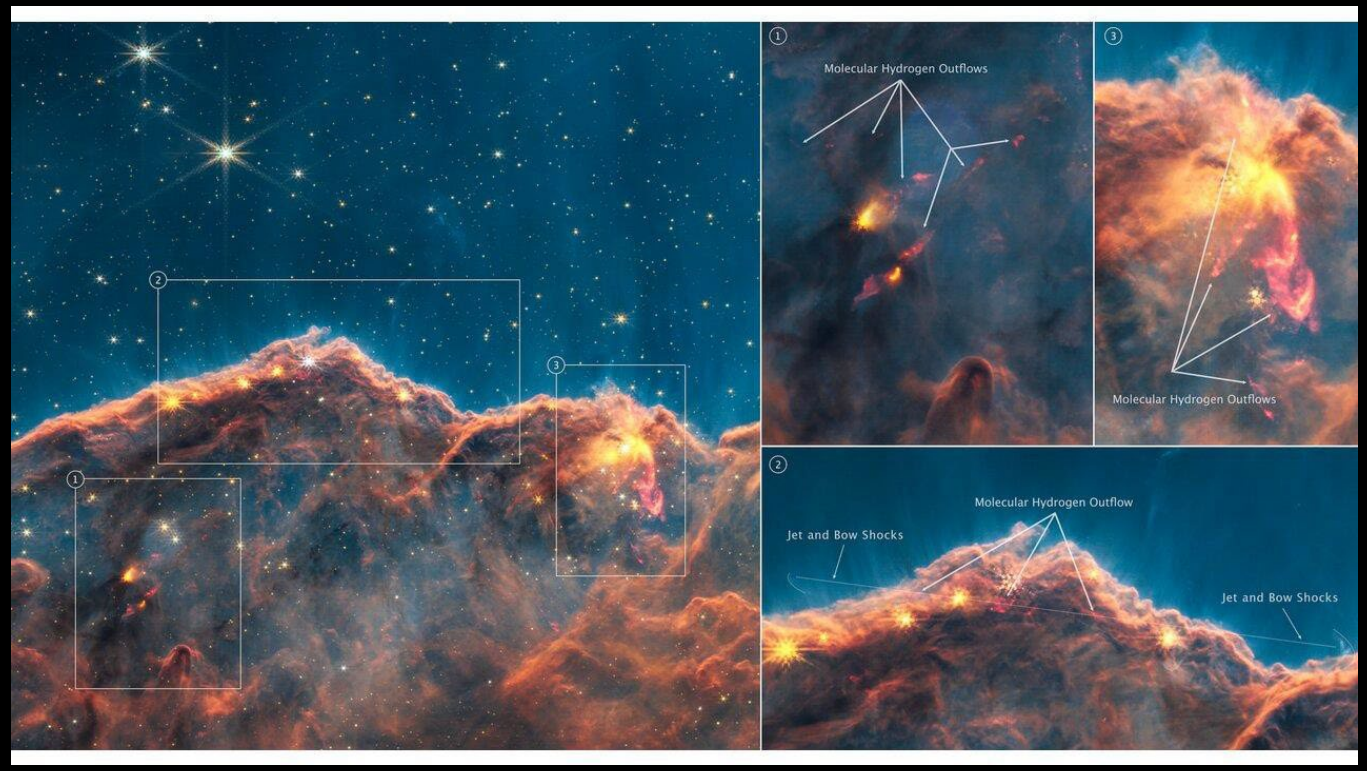
JWST and Hubble latest photos 10

- A “deep-dive” of one of JWSTs first images has identified dozens of energetic jets and outflows from young stars previously hidden by dust clouds
- The Cosmic Cliffs is a region at the edge of a gigantic, gaseous cavity within NGC 3324
- Although surveyed by Hubble, many of the star formations remain hidden in visible light



Credit: NASA, ESA, CSA, STScI. SCIENCE: Megan Reiter (Rice University). Image Processing: Joseph DePasquale (STScI), Anton M. Koekemoer (STScI)

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Stargazing with Team Supermassive

- Check out episode 36 of the Royal Astronomical Society's podcast with our own Dr Robert Massey
- Robert discusses what to look for when buying binoculars or a telescope for astronomy
- Science journalist Izzie Clarke tries the Thompson 26" refractor at Herstmonceux Observatory, Sussex
- Dr Becky Smethurst explains the advantages of using space-based telescopes
- Find out more about the Thompson refractor at: https://www.the-observatory.org/dome-e
- Listen to the Supermassive podcast at: https://audioboom.com/posts/8217834-stargazing-with-team-supermassive

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Observational Highlights

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January 2023 dates

- 3rd January – Angelina (minor planet 64) at opposition – mag +10.4
- 4th January – Quadrantids meteor shower peaks (04:00)
- 4th January – Earth closest to the Sun (perihelion) – 0.9833 AU
- 6th January – Full (Wolf) Moon (23:07) – Lunation 1237
- 8th January – Moon furthest from the Earth (apogee) – 406,458 km
- 8th January – Pallas (minor planet 2) at opposition – mag +7.6
- 21st January – New Moon (20:53) – Lunation 1238
- 24th January – Julia (minor planet 89) at opposition – mag +10.4
- 25th January – Hebe (minor planet 6) at opposition – mag +8.7

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Planets (@ 01-01-2023)

(data supplied courtesy of In the Sky)

Planet	Rises	Sets	Highest	Direction	Altitude	Magnitude	Visible?
Mercury	08:40	17:11	12:57			+1.25	NO
Venus	09:11	17:22	13:14			-3.91	NO
Mars	13:20	06:02	21:41	South	63°	-1.22	YES
Jupiter	11:21	23:21	17:21	South	38°	-2.40	YES
Saturn	10:10	19:41	14:56	South-West	19° **	+0.82	YES
Uranus	12:39	03:31	20:05	South	55°	+5.70	YES
Neptune	11:07	22:34	16:50	South	34° **	+7.91	YES

* = Highest point at Dawn (06:32 - last visible sighting) ** = Highest point at Dusk (17:32 - first visible sighting)

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Deep Sky Objects 1 (@ 01-01-2023)

[*** = circumpolar]

Object	Name	Type	Rises	Sets	Highest	Direction	Alt	Mag
M45	The Pleiades (Taurus)	Open Cluster	12:45	05:21	21:03	South	63º	+1.3
M44	The Beehive Cluster (Cancer)	Open Cluster	18:10	09:47	01:59	South	58º	+3.1
M31	Andromeda Galaxy (Andromeda)	Galaxy	***	***	17:58	South	80º	+3.4
M42	The Orion Nebula (Orion)	Open Cluster	19:39	02:40	23:10	South	33º	+4.0
NGC1981	Sword Cluster (Orion)	Open Cluster	17:08	04:32	22:50	South	34º	+4.2
NGC2232	Open Cluster (Monoceros)	Open Cluster	18:03	05:22	23:43	South	34º	+4.2
M47	Open Cluster (Puppis)	Open Cluster	20:05	05:45	00:55	South	24º	+4.4
NGC2244	“Rosette Nebula” (Monoceros)	Open Cluster	17:18	06:15	00:55	South	44º	+4.8
NGC869	H Persei (Double) (Perseus)	Open Cluster	***	***	19:34	North	83º	+5.3
M5	Globular Cluster (Serpens)	Globular Cluster	02:41	15:09	06:32*	South-East	32º	+5.7
M33	Triangulum Galaxy (Triangulum)	Galaxy	09:36	04:02	18:49	South	69º	+5.7
M13	Great Globular Cluster (Hercules)	Globular Cluster	23:47	20:50	06:32*	East	50º	+5.8
NGC884	Chi Persei (Double) (Perseus)	Open Cluster	***	***	19:38	North	83º	+6.1
M3	Globular Cluster (Canes Venatici)	Globular Cluster	22:28	16:11	06:32*	South-East	66º	+6.3
M15	Globular Cluster (Pegasus)	Globular Cluster	08:00	22:11	17:32**	South-West	38º	+6.3
M92	Globular Cluster (Hercules)	Globular Cluster	***	***	06:32*	East	49º	+6.5

* = Highest point at Dawn (06:32 - last visible sighting) ** = Highest point at Dusk (17:32 - first visible sighting)

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Deep Sky Objects 2 (@ 01-01-2023)

[*** = circumpolar]

Object	Name	Type	Rises	Sets	Highest	Direction	Alt	Mag
M2	Globular Cluster (Aquarius)	Globular Cluster	09:10	21:09	17:32**	South-West	27º	+6.6
M81	Bode's Galaxy (Ursa Major)	Galaxy	***	***	03:14	North	88º	+6.9
M101	Pinwheel Galaxy (Ursa Major)	Galaxy	***	***	06:32*	North-East	81º	+7.9
M104	Sombrero Galaxy (Virgo)	Galaxy	00:52	11:03	05:58	South	27º	+8.0
M110	'Satellite' Galaxy - 1 (Andromeda)	Galaxy	***	***	17:56	South	80º	+8.1
M94	'Spiral' Galaxy (Canes Venatici)	Galaxy	***	***	06:08	South	80º	+8.2
M1	The Crab Nebula (Taurus)	S'nova Remnant	17:42	04:36	23:09	South	61º	+8.4
M51	Whirlpool Galaxy (Canes Venatici)	Galaxy	***	***	06:32*	South-East	85º	+8.4
M57	The Ring Nebula (Lyra)	Planetary Nebula	17:32	21:09	17:32**	West	30º	+8.8
NGC2403	Caldwell 7 (Camelopardalis)	Galaxy	***	***	00:55	North	88º	+8.9
M32	'Satellite' Galaxy - 2 (Andromeda)	Galaxy	***	***	17:58	South	80º	+9.0

Twilight	Civil	Nautical	Astronomical
Morning (begins)	07:21	06:39	05:59
Evening (ends)	16:43	17:25	18:06

	Rises	Sets
Sun	08:01	16:04
Moon	12:31	03:47

* = Highest point at Dawn (06:32 - last visible sighting) ** = Highest point at Dusk (17:32 - first visible sighting)

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Phases of the Moon

Brown Lunation Number: 1237 (numbered from first New Moon in 1923)

New Moon	23rd December	10:16
First Quarter	30th December	01:20
Full Moon	6th January	23:07
Last Quarter	15th January	02:10

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Friday 20th January 2023
A short talk followed by an evening of observing with telescopes
Arlington village hall, members only

Wednesday 1st February 2023
"Satellite megaconstellations and their impact on astronomy today"
Dr Robert Massey, Lewes town hall, guests welcome

Wednesday 1st March 2023
"The rise and fall of an observatory at Herstmonceux"
Keith Brackenborough, Lewes town hall, guests welcome

Friday 10th March 2023
A short talk followed by an evening of observing with telescopes
Arlington village hall, members only

www.lewesas.org.uk