

# Lewes Astronomical Society

Newsletter - October 2022

**Lewes Astronomical Society**

**Astronomy & Space News**

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## Artemis 1 launch More problems and delays



Credit: NASA/Kim Shiflett

- 1<sup>st</sup> launch on August 29<sup>th</sup> aborted after sensor malfunctioned
- 2<sup>nd</sup> launch on September 3<sup>rd</sup> scrubbed after liquid hydrogen fuel leak
- Repairs to fix leak done in situ rather than return to VAB
- Tanking test on September 21<sup>st</sup> saw leaks but within parameters
- 25 day time limit on batteries for self-destruct mechanism waived
- 3<sup>rd</sup> launch (September 27<sup>th</sup>) abandoned due to Hurricane Ian
- Rocket returned to VAB - no new date for launch announced yet

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## Blue Origin Mission Failure

- 23<sup>rd</sup> launch of the New Shepherd rocket ended in failure after booster malfunctioned one minute into flight on 12<sup>th</sup> September
- Uncrewed capsule safely recovered after emergency escape system triggered
- Rocket crash landed
- FAA has grounded rockets pending investigation
- So far 32 people have been sent into sub-orbit by Jeff Bezos's Blue Origin organisation



Credit: Blue Origin

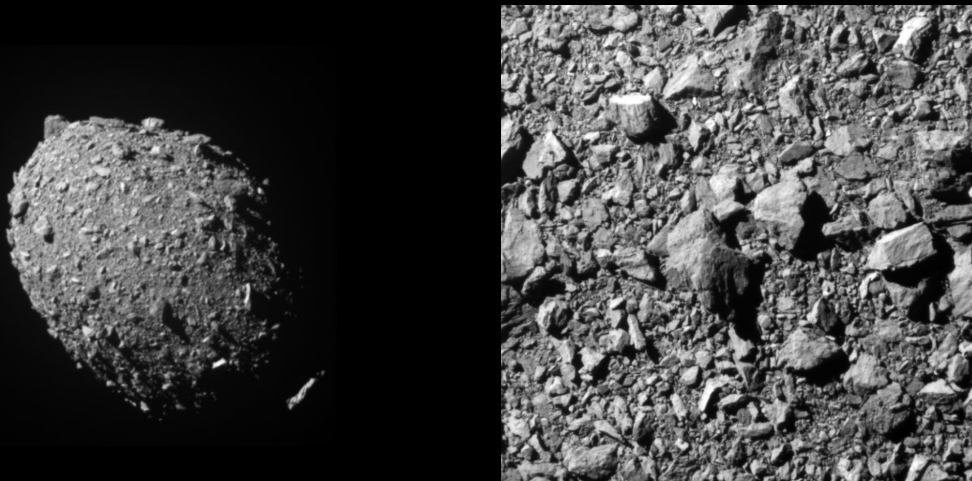
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## DART Spacecraft Collision with Asteroid

- DART was deliberately crashed into Dimorphos, a moonlet of Didymos on 26<sup>th</sup> September
- Impact may alter the orbital period of Dimorphos by several minutes, observable from Earth
- Test will prove whether Earth-bound asteroids can be deflected away



Credit: NASA/John Hopkins APL/Steve Gribben



2 DART photos of Dimorphos  
11 seconds and 2 seconds  
(68 km and 11 km) before  
impact. Credit: NASA/John  
Hopkins APL

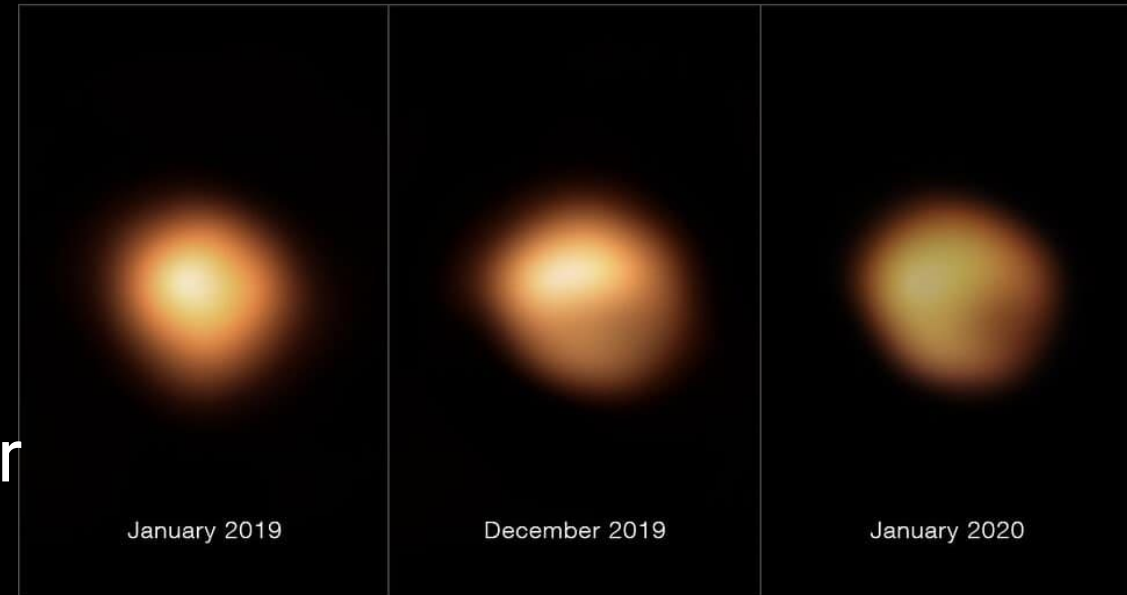
Plume of debris enveloping  
Dimorphos after collision,  
with Didymos in foreground.  
Photo taken by LICIACube  
probe. Credit: NASA/ASI



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## Betelgeuse dimming

- Betelgeuse is a variable red giant star in Orion with normally predictable dimming every 416 days
- Two years ago it dimmed much more dramatically – was it about to go supernova?
- Cool spot in the southern hemisphere first seen then large dust cloud formed obscuring much of the star's light



Credit: ESO/M. Montarges et al

- Betelgeuse experienced massive violent eruption
- 400 billion times as much material was ejected than happens at a normal Coronal Mass Ejection from the Sun

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## Exoplanets



Credit: ESO

- Two super-Earth exoplanets found orbiting the same small cool star 100 light years away
- TESS (Transiting Exoplanet Surveying Satellite) first identified the innermost planet, orbiting every 2.7 days, a couple of years ago
- This was confirmed by the SPECULOOS telescope in Chile operated by University of Birmingham, UK, who recently discovered a second planet
- This orbits every 8.5 days within its habitable zone. It is the second-most favourable habitable-zone terrestrial planet to be found so far
- Webb has discovered carbon dioxide in the atmosphere of WASP-39b, a “Hot Jupiter” exoplanet approximately 700 light years away

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## Charon's red north pole

- Charon is the largest moon of Pluto
- Reddish-brown material at pole is tholin, a tar-like complex organic compound
- When younger and warmer Charon had liquid oceans (including methane)
- Oceans froze over time but cryovolcanic vents emitted methane
- Methane migrated to pole where it was converted by Sun's radiation into tholin



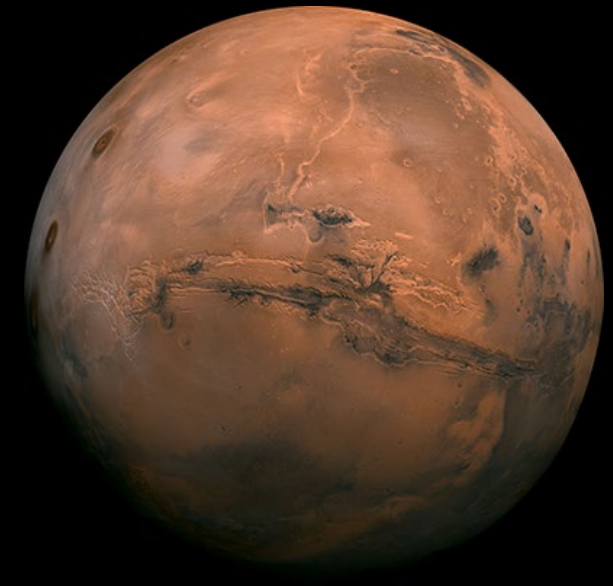
Credit: NASA/JPL-JHU/SWRI



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## Latest discoveries on Mars

- Mars born with dense atmosphere and warm oceans
- Once had many more lakes than was previously thought
- Perseverance Rover detects highest concentration of organic molecules hinting at possible past life
- Wind shapes the geology of Mars today
- InSight probe records meteorite impacts



Credit: NASA Mars Exploration



Curiosity tracks in the "Dingo Gap" valley (Credit: NASA/JPL-Caltech/MSSS)

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## Frank Drake, 1930–2022

- Drake Equation first put forward in 1961
- Postulates number of intelligent civilisations

The diagram illustrates the Drake Equation,  $N = R_* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$ , with each variable and its corresponding label:

- $N$ : The number of detectable civilizations in the Milky Way galaxy
- $R_*$ : The rate at which stars are born
- $f_p$ : The fraction of stars that host planets
- $n_e$ : The number of habitable planets per planetary system
- $f_l$ : The fraction of those planets on which life occurs
- $f_i$ : The fraction of life that evolves intelligence
- $f_c$ : The fraction of intelligent life that develops communicative technologies
- $L$ : The average length of time civilizations are detectable



Credit: Ramin Rahimian

Frank Drake  
28/05/1930 – 02/09/2022

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## First Female European Commander of ISS

- Samantha Cristoforetti (Italy) became the first female European Commander of the International Space Station (ISS) on Wednesday 27<sup>th</sup> September
- She has been on-board since April 2022 (Minerva Mission)
- This is her second mission
- She is the fifth European Commander in the 67 missions so far



Credit: ISRO/Twitter

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## Webb and Hubble latest photos

- Inner region of the Orion Nebula
- 1,350 light years away
- Webb, viewing in Infra-red, can peer through the dust

Hubble (color)



Credits: NASA, C.R. O'Dell and S.K. Wong (Rice University)

JWST (color)



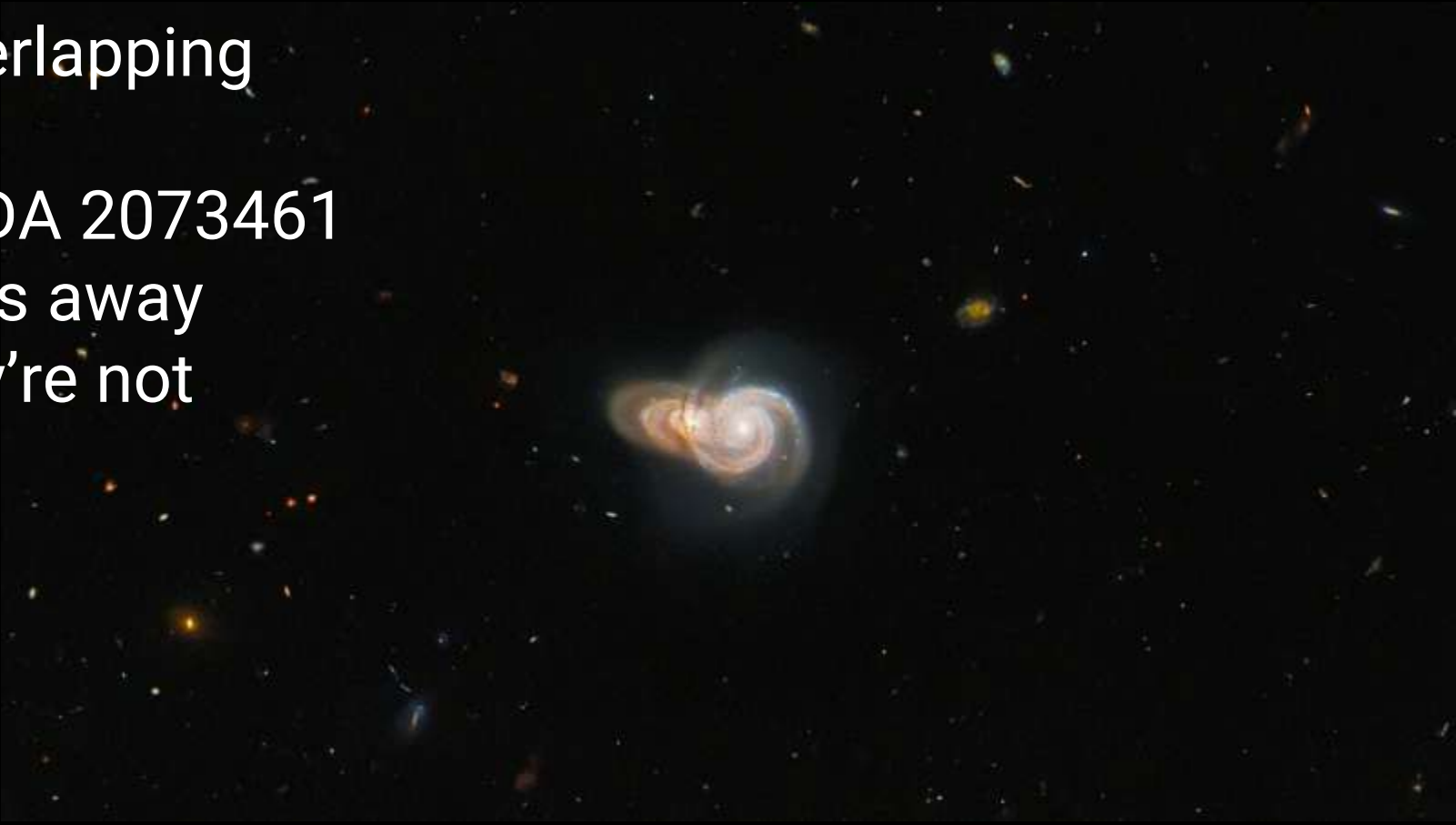
Credits: NASA / ESA / CSA / PDRs4All team / S. Fournmeyer

Credit: NASA/STScI/C.R.O'Dell and S.K.Wong (Rice University) – left image  
NASA/ESA/CSA/PDRs4All ERS team/S.Fournmeyer – right image

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## Webb and Hubble latest photos

- Hubble images two overlapping galaxies
- SDSS J115331 and LEDA 2073461 are  $> 1$  billion light years away
- Chance alignment, they're not actually colliding



Credit: ESA/Hubble & NASA/W. Keel

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## Webb and Hubble latest photos

- Webb captures the Tarantula Nebula
- 161,000 light years away
- Radiation from young blue stars blasting gas and dust away from centre



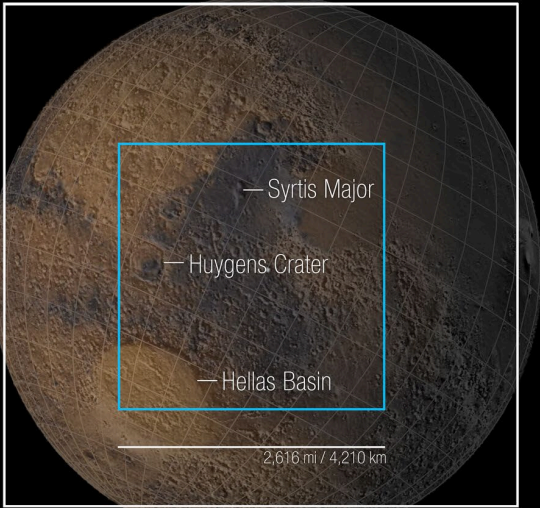
Credit: NASA/ESA/CSA/STScI

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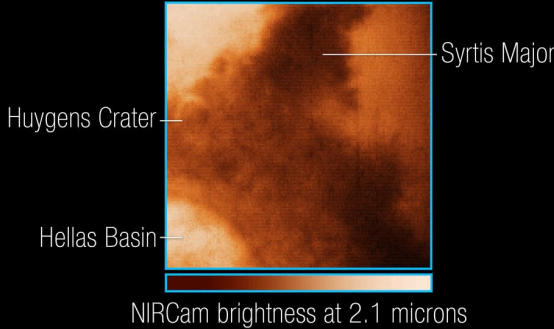
## Webb and Hubble latest photos

- Webb's NIRCAM images OF Mars taken on September 5<sup>th</sup>
- Top right shows sunlight reflecting off craters and layers of dust and volcanic material
- Bottom right shows surface and atmospheric temperature differences with variations due to latitude and time of day

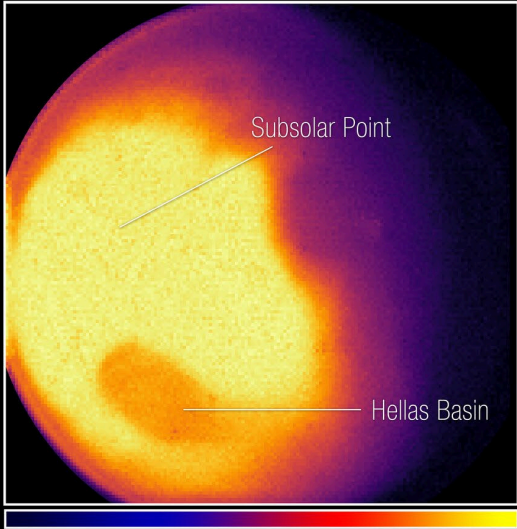
Mars  
James Webb Space Telescope  
NIRCam - September 5, 2022



Simulated Mars image with base maps from NASA and MOLA data



NIRCam brightness at 2.1 microns

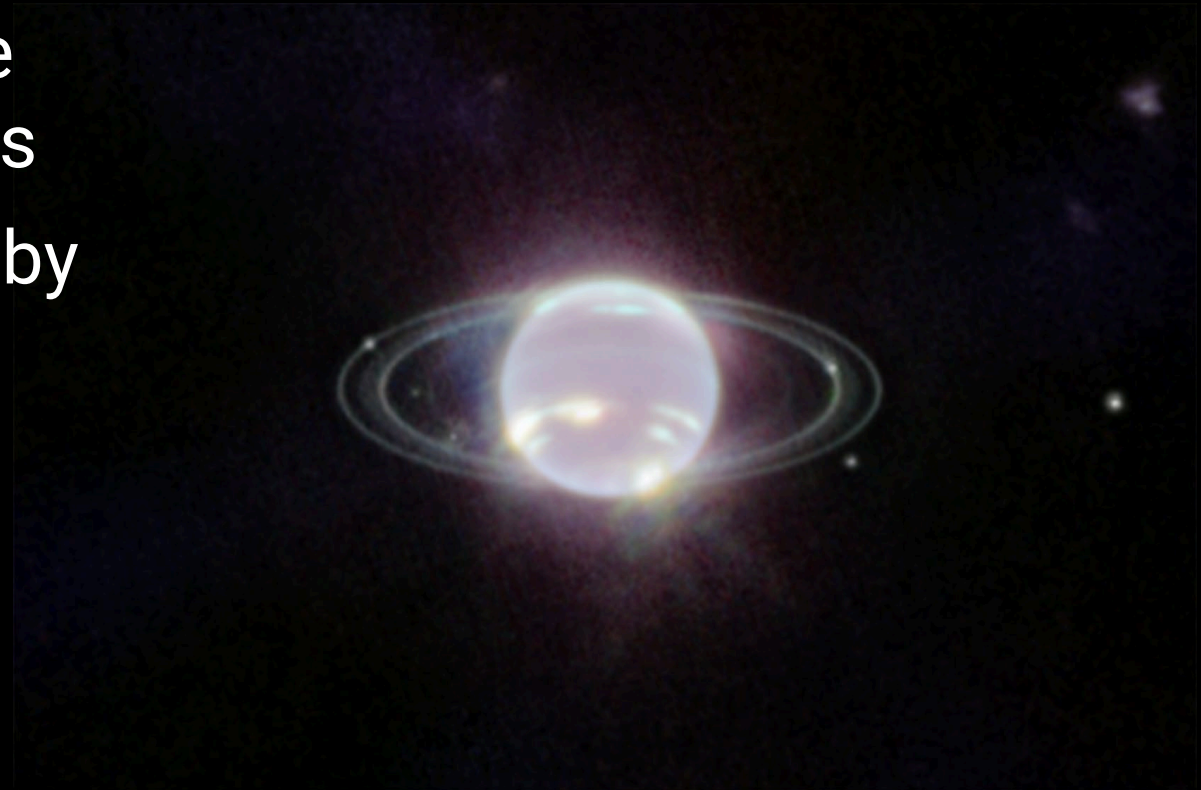


NIRCam brightness at 4.3 microns

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## Webb and Hubble latest photos

- Webb view of Neptune's rings is the best observed in more than 30 years
- Last close-up images were in 1989 by Voyager 2
- Several moons are visible
- Methane clouds around Neptune absorb IR so planet appears darker



Credit: NASA/ESA/CSA/STScI



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# **Observational Highlights**

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## October 2022 dates

- 8<sup>th</sup>/9<sup>th</sup> October – Draconids Meteor Shower
- 8<sup>th</sup> October – Mercury at greatest elongation west (and highest altitude in the morning sky before sunrise on the 9<sup>th</sup>)
- 9<sup>th</sup> October – Full Moon (Hunter's Moon)
- 21<sup>st</sup>/22<sup>nd</sup> October – Orionid Meteor Shower
- 25<sup>th</sup> October – Partial Solar Eclipse and hence a New Moon
- 30<sup>th</sup> October – BST ends at 2am, clocks go back to GMT (UT)

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## Draconid Meteor Shower

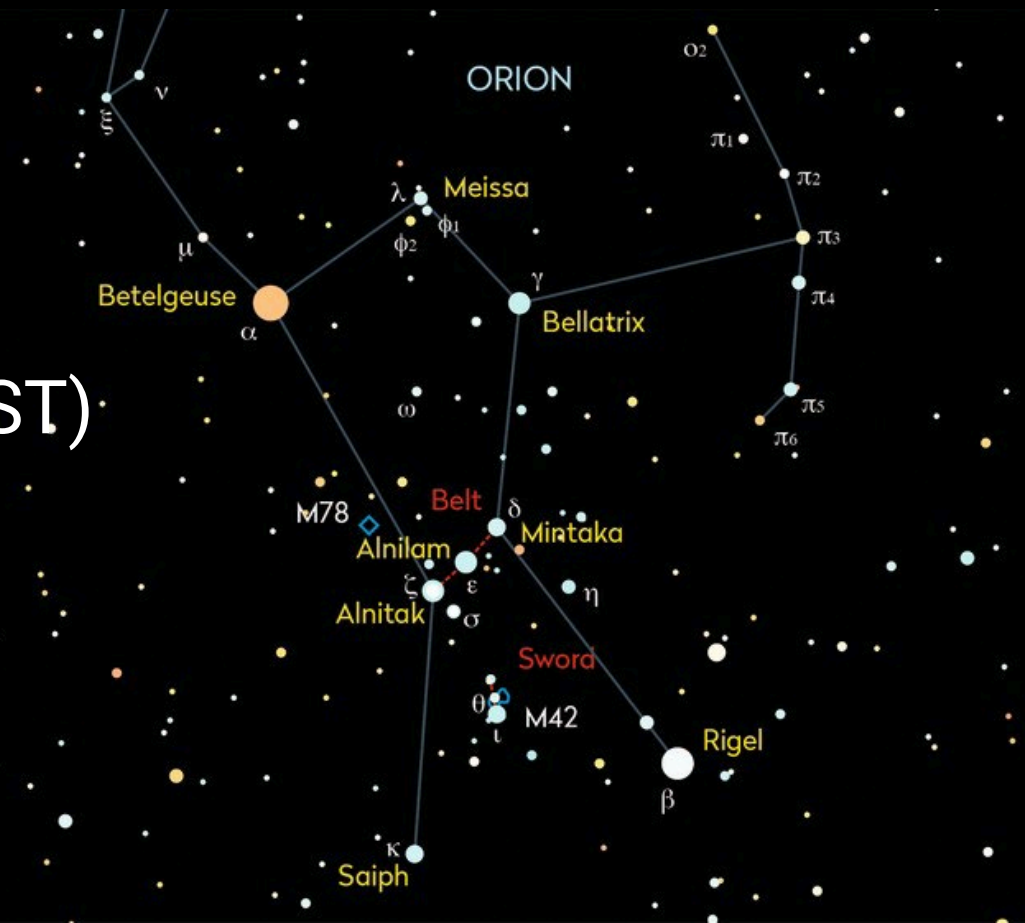
- Evening of 8<sup>th</sup> /evening of 9<sup>th</sup> October
- Northwest to overhead (circumpolar)
- In constellation of Draco, the dragon
- Best seen in evening after nightfall
- Rate: up to 10 per hour
- Speed: slow
- Brightness: average (significant moonlight)
- Parent: 21P/Giacobini-Zinner Comet



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## Orionid Meteor Shower

- Night of 21<sup>st</sup> / morning of 22<sup>nd</sup> October
- Eastern sky (late evening after 10pm BST)
- In constellation of Orion
- Best seen after midnight
- Rate: up to 12-15 per hour
- Speed: fast
- Brightness: bright (minimal moonlight)
- Parent: 1P/Halleys Comet



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## Phases of the Moon

							
New	Waxing Crescent	1st Qtr	Waxing Gibbous	Full	Waning Gibbous	Last Qtr	Waning Crescent

Brown Lunation Number: 1234 – 1235

First Quarter            3<sup>rd</sup> October

Full Moon                9<sup>th</sup> October

Last Quarter            17<sup>th</sup> October

New Moon                25<sup>th</sup> October

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## Partial Solar Eclipse

- Tuesday 25<sup>th</sup> October
- 10:08am – 11:51am BST
- Max 15% obscured at 10:59am BST
- **DO NOT** view with naked eye – use either solar eclipse glasses or pinhole projection onto card



Credit: [Stockphoto.com/clintspencer](https://www.stockphoto.com/clintspencer)

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## Planets (@ 01/10/2022 – times are BST)

<u>Planet</u>	<u>Rises</u>	<u>Sets</u>	<u>Highest</u>	<u>Direction</u>	<u>Altitude</u>	<u>Magnitude</u>	<u>Visible?</u>
Mercury	05:44	18:10	11:57	South-East	16°	+1.4	YES
Venus	06:21	18:35	12:28			-3.9	NO
Mars	21:31	13:42	05:36	South-West	61°	-0.6	YES
Jupiter	18:32	06:36	00:34	South	38°	-2.9	YES
Saturn	17:05	02:23	21:44	South	22°	+0.5	YES
Uranus	19:52	10:55	03:24	South	56°	+5.7	YES
Neptune	18:10	05:40	23:55	South	35°	+7.8	YES

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## Deep Sky Objects (@ 01/10/2022 – times are BST)

<u>Object</u>	<u>Name</u>	<u>Type</u>	<u>Rises</u>	<u>Sets</u>	<u>Highest</u>	<u>Direction</u>	<u>Alt</u>	<u>Mag</u>
M45	The Pleiades (Taurus)	Open Cluster	19:50	12:26	04:08	South	63°	+1.3
M44	The Beehive Cluster (Cancer)	Open Cluster	01:12	16:49	05:40 *	East	40°	+3.1
M31	Andromeda Galaxy	Galaxy	***	***	05:40 *	West	42°	+3.4
M42	The Orion Nebula	Nebula	01:45	11:56	05:40 *	South	33°	+4.0
NGC1981	Sword Cluster (Orion)	Open Cluster	00:14	11:37	05:40 *	South	34°	+4.2
NGC2232	Open Cluster (Monoceros)	Open Cluster	01:09	12:28	05:40 *	South	32°	+4.2
IC4665	Open Cluster (Ophiuchus)	Open Cluster	11:33	00:36	19:56 **	South-West	36°	+4.2
NGC6633	Open Cluster (Ophiuchus)	Open Cluster	12:10	01:21	19:56 **	South-West	43°	+4.6
IC4756	Graff's Cluster (Serpens)	Open Cluster	12:27	01:28	19:56 **	South	42°	+4.6
NGC2244	Satellite Cluster (Rosette Nebula)	Open Cluster	00:24	13:20	05:40 *	South-East	41°	+4.8
NGC869	Double Cluster (west) (Perseus)	Open Cluster	***	***	02:40	North	83°	+5.3
M33	Triangulum Galaxy	Galaxy	16:42	11:08	01:55	South	69°	+5.7
M13	Hercules Globular Cluster	Globular Cluster	06:29	03:32	19:56 *	West	55°	+5.8
NGC884	Double Cluster (east) (Perseus)	Open Cluster	***	***	02:43	North	83°	+6.1
M12	Globular Cluster (Ophiuchus)	Globular Cluster	11:12	23:00	19:56 *	South-West	25°	+6.1
M15	Globular Cluster (Pegasus)	Globular Cluster	14:43	04:53	21:48	South	51°	+6.3

\* = Highest point at Dawn (last visible sighting)    \*\* = Highest point at Dusk (first visible sighting)    \*\*\* = Circumpolar



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## Next Meetings

Friday 21<sup>st</sup> October: Observing with telescopes, Arlington village hall, members only

Wednesday 2<sup>nd</sup> November: News from JWST, Dr Stephen Wilkins, Lewes town hall, guests welcome

Wednesday 7<sup>th</sup> December: A couple of short talks by our members, Lewes town hall, guests welcome

Friday 20<sup>th</sup> January: Observing with telescopes, Arlington village hall, members only



[www.lewesas.org.uk](http://www.lewesas.org.uk)