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1. A star with a heartbeat & without a magnetic field discovered (Jan. 8, 2022)

A group of Indian and international scientists have spotted a peculiar binary star that shows heartbeat but no pulsations contrary to the norm of binary stars. **This star is called HD73619 in Praesepe (M44), located in the Cancer constellation, one of the closest open star clusters to the Earth.**

- A total of about 180 heartbeat stars are known to date. The name 'Heartbeat' stems from the resemblance of the path of the star to an electrocardiogram of the human heart.
- These are the binary star systems where each star travels in a highly elliptical [orbit](#) around the common centre of mass, and the distance between the two stars varies drastically as they orbit each other.
- This is carried out by a team of scientists from Aryabhata Research Institute of Observational Sciences (ARIES), Nainital an autonomous institution under the Department of Science & Technology (DST), Govt of India.
- The discovery is of vital importance for the study of inhomogeneities due to spots in non-magnetic stars and to investigate the origin of the pulsational variability.

This joint work is supported by the Department of Science & Technology (DST), Govt. of India, and the Belgian Federal Science Policy Office (BELSPO), Govt. of Belgium under the Belgo-Indian Network for Astronomy and Astrophysics (BINA), project.

2. New Variant of Corona virus identified in France (Jan. 6, 2022)

The World Health Organization said that **'IHU'**, a coronavirus variant found in France, hasn't become much of a threat since it was first identified in November.

- The variant was identified in 12 people in the southern Alps around the same time that omicron was discovered in South Africa last year.

3. ISRO gearing up for multiple missions in the year 2022 (Jan. 4, 2022)

One of the most anticipated launches of ISRO in 2022 is that of its first unmanned mission of Gaganyaan to Lower Earth Orbit(LEO). GSLV Mk III will be used for this mission. Glavkosmos, which is a subsidiary of the Russian space corporation Roscosmos is supporting ISRO in this mission.

Other notable launches include-

- **Earth Observation Satellites EOS4 and EOS6** onboard the **Polar Satellite Launch Vehicle (PSLV).**
- **Earth Observation Satellite EOS02** on board the maiden flight of the **Small Satellite Launch Vehicle (SSLV)**
- **Chandrayaan 03** - It will be India's third planned **lunar exploration mission**. It will be a mission repeat of Chandrayaan-2 but will **only include a lander and rover**

similar to that of Chandrayaan-2 but will not have an orbiter. GSLV Mk III will be used for this mission.

Aditya L1 - First Indian mission to study the Sun. It is a planned coronagraphy spacecraft to study the solar atmosphere. Aditya-L1 will be placed in a 'libration orbit', which is about 1.5 million km from Earth. It is about 1% of the distance between the Sun and the Earth, where the gravity of the two celestial objects equalizes. Placing it in such an orbit allows the spacecraft to circle along with the earth, thereby constantly facing the Sun.

- **XpoSat - The X-ray Polarimeter Satellite (XPoSat) is a planned space observatory to study the polarization of cosmic X-rays. It will be launched on a Small Satellite Launch Vehicle (SSLV). It will be a five-year mission,** carrying a polarimeter instrument made by Raman Research Institute to measure cosmic radiation. The spacecraft will be placed in a circular 500-700km orbit
- **IRNSS** - Indian regional navigation satellite system

Other notable future missions of ISRO are-

- **Venus mission,**
- **DISHA** (Disturbed and quiet-type System at High Altitude) -twin **aeronomy (uppermost layer of Earth's atmosphere)** satellite mission at an altitude of 450km.
- **TRISHNA** (Thermal infraRed Imaging Satellite for High-resolution Natural resource Assessment), an **ISRO-CNES [Centre national d'études spatiales France] mission in 2024 for accurate mapping of land surface temperatures across the globe.** It will be launched in sun-synchronous orbit at an altitude of 750km with a mission life of 5 years

Indian Space Research Organisation (ISRO)

Headquarters - Bengaluru, Karnataka

Chairman - Kailasavadivoo Sivan

Nodal authority - Department of Space under Prime Minister of India

Main launchpad - Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh

4. Iran launches a new rocket into space (Dec. 31, 2021)

- The launch was carried out by the **Iranian Space Agency.**
- The rocket was launched from **Imam Khomeini Space Launch Terminal located at Semnan space center, 300 km east of Tehran.**
- The rocket or the Satellite launch vehicle used for this mission was **Simorgh. It is also known as Phoenix or Safir-2 (Safir was Iran's first space launch vehicle).**
- **Tehran successfully put its first military satellite into orbit in April 2020.**
- Iran always insists that its **space program is for civilian and defense purposes only,** and does not breach the nuclear deal or any other international agreement.

- Western governments worry that satellite launch systems incorporate technologies interchangeable with those used in ballistic missiles capable of delivering a nuclear warhead.
- **Iranian Space Agency**
 - Established in 2004
 - Iran is one of the 24 founding members of the **United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), which was set up on 13 December 1958.**
 - **Iran became an orbital-launch-capable nation in 2009.**
 - **Some of Iran's satellite launch vehicles are Safir, Simorgh, Zuljanah, Qoqnoos, and Soroush.**
 - Iran's main launch center is Imam Khomeini Space Launch Terminal located at Semnan.
 - **Omid is Iran's first indigenously-launched satellite.**

5. Two Covid vaccines and drugs got approval in India (Dec. 29, 2021)

- **Central Drugs Standard Control Organisation(CDSCO)** has approved two more COVID-19 vaccines, **Corbevax and Covovax**, and an **anti-COVID pill Molnupiravir** for restricted emergency use in India.
- CORBEVAX vaccine, made by Hyderabad-based firm Biological-E is India's first indigenously developed **RBD (receptor-binding domain) protein subunit vaccine** against COVID-19.
- The **nanoparticle-based vaccine Covovex** has been **developed by Serum Institute of India**, a pharma firm based in Pune.
- Molaupiravir is the first oral medicine approved by the UK Medicines and Healthcare products Regulatory Agency.
- After this approval, the number of vaccines that can be used in emergency situations in the country has now increased to 8.

Other approved Covid Vaccines in India are:

- Covishield
- Covaxin
- ZyCoV-D
- Sputnik V
- Moderna
- Johnson and Johnson

6. NASA launches world's most powerful James Webb telescope (Dec. 26, 2021)

- World most powerful space telescope, the James Webb telescope was successfully launched on 25 December 2021. It is more powerful than the Hubble space telescope launched by NASA in 1990.
- The James Webb telescope mission was launched by National Aeronautics and Space Administration (NASA) of the U.S. in association with the European Space Agency and Canadian Space Agency.

Aim of the Mission

- The aim of the mission is to seek the light from the first galaxies in the early universe and to explore our own solar system to understand the origin of our universe, as well as planets orbiting other stars, called exoplanets.
- Its mirror measures 6.5 metres (21 feet) in diameter — three times the size of Hubble's mirror — and is made of 18 hexagonal sections.

From where it was launched

- The telescope was launched on board Ariane -5 rocket of the European Space Agency from its European Spaceport located near Kourou, French Guiana in South America.

Where it will be deployed

- The location of Webb's orbit is called the Lagrange 2 point which is around 15 lakh kilometers from Earth and it was chosen in part because it will keep the Earth, the Sun and the Moon all on the same side of its sun shield.
- Webb is expected to officially enter service in June.

Why was it named Webb telescope

The telescope has been named after the NASA director James Webb who was an integral part of the Apollo mission from 1961-1966. The Apollo mission of NASA was to put man on the surface of the Moon.

7. Covishield Effect wanes after 3 months: Lancet Study (Dec. 22, 2021)

- According to the study published in **The Lancet Journal**, the protection offered by the **Oxford-AstraZeneca (known as Covishield in India) COVID-19** vaccine declines after three months of receiving two doses of the preventive.
- The findings **drawn from datasets in Brazil (for 42 million people) and Scotland (for 2 million people)** suggest that booster programmes are needed to help maintain protection from severe disease in those vaccinated with AstraZeneca.

The Lancet is a weekly peer-reviewed general medical journal. It was founded in 1823 by Thomas Wakley, an English surgeon who named it after the surgical instrument called a lancet.

8. NASA's Parker Solar Probe, first ever mission to "Touch the Sun" (Dec. 21, 2021)

NASA's Parker Solar Probe, first ever mission to "Touch the Sun"

The Parker Solar Probe of the **National Aeronautics and Space Administration (NASA's) of the United States**, became the first manmade object to touch the **Sun's upper atmosphere, the Corona, for** the first time in human history.

- It was **launched by NASA on 12th August 2018**, from the **Cape Canaveral Air Force Station, Florida on board** the **Delta IV-Heavy launch vehicle**.
- **Parker Solar Probe** actually flew through the corona (**Alfven point**) on **28th April 2021 during the spacecraft's eighth close approach to the sun**.
- It was designed and built by the **Johns Hopkins University Applied Physics Laboratory**.
- It has been **named** so **to honour** nonagenarian American astrophysicist **Eugene Newman Parker**, who developed **the theory of the supersonic solar wind and predicted the Parker spiral shape of the solar magnetic field in the outer Solar System**.

The probe passed by at a ridiculous **speed of 363,660 mph, making it the fastest artificial object ever created**.

The primary science goals for the mission are to trace how energy and heat move through the solar corona and to explore what accelerates the solar wind as well as solar energetic particles.

India's first Mission to study the Sun:

Aditya or Aditya-L1 is a planned **coronagraphy spacecraft** to study solar atmosphere, currently being designed and developed by **Indian Space Research Organisation (ISRO)** and various other Indian research institutes.

- It is **planned to be launched in the third quarter of 2022 aboard a PSLV-XL launch vehicle**.
- The spacecraft will study **coronal heating, solar wind acceleration, coronal magnetometry, origin and monitoring of near-UV solar radiation** and continuously **observe photosphere, chromosphere and corona, solar energetic particles and magnetic field** of the Sun.

9. 21st December Earth's Northern Hemisphere witnesses the year's shortest day (Dec. 21, 2021)

Earth's Northern Hemisphere observes the **Winter Solstice, the shortest day and longest night of the year on 21st December**.

- A solstice is an astronomical event , when the tilt of Earth's axis with respect to the Sun is maximum.
- This day also marks the longest day of the year in the Southern Hemisphere, called the summer solstice of the region.
- Winter Solstice takes place on **either December 21 or 22**.

10. Installed Nuclear Power capacity in India (Dec. 17, 2021)

- Government of India has informed the Parliament about the status of the Nuclear Power Plant in India
- The present nuclear power capacity of 6780 MW is planned to be increased to 22480 MW by 2031.

- At present the share of nuclear power in the total electricity generation in the country is about 3.1% in the year 2020-21.
- Government has given approval to the setting up of six nuclear power reactors of 1650 MW each in technical cooperation with France which would make it the largest nuclear power generating site with a total capacity of 9900 MW at Jaitapur in Maharashtra.

- At present the Kudankulam Nuclear Power plant in Tamil Nadu being built with the help of Russia is the largest Nuclear Power plant in India with a capacity of 2000MW and further 2000 MW under construction.
- The first Nuclear Power plant in India was set up in 1969 at Tarapur in Maharashtra .