

# Scientists find habitable 'super-Earth' among 15 new planets

**Tokyo, Mar 12:** Scientists have discovered 15 new planets -- including one 'super-Earth' that could harbour liquid water -- orbiting small, cool stars near our solar system.



The stars, known as red dwarfs, are of interest for studies of planetary formation and evolution, said the team led by Teruyuki Hirano from the Tokyo Institute of Technology.

"Red dwarf systems, especially coolest red dwarfs, are just beginning to be investigated, so they are very exciting targets for future exoplanet research," Hirano said.

One of the brightest red dwarfs -- K2-155 that is around 200 light years away from Earth -- has three transiting "super-Earths", which are slightly bigger than our own planet.

Of those three "super-Earths", the outermost planet, K2-155d, with a radius 1.6 times that of Earth, could be within the host star's habitable zone, the researchers noted in the study

appeared in The Astronomical Journal. The team found that K2-155d could potentially have liquid water on its surface based on three-dimensional global climate simulations.

To reach this conclusion, the team sifted through data from NASA Kepler spacecraft's second mission, K2, and follow-up observations using ground-based telescopes, including the Subaru Telescope in Hawaii and the Nordic Optical Telescope (NOT) in Spain.

A more precise estimate of the radius and

temperature of the K2-155 star would be needed to conclude definitively whether K2-155d is habitable.

Achieving such precision would require further studies, for example, using interferometric techniques, the researchers said.

The researchers also investigated the relationship between planet radius and metallicity of the host star.

"Large planets are only discovered around metal-rich stars and what we found was consistent with our predictions. The few planets with a radius about three times that of

Earth were found orbiting the most metal-rich red dwarfs," Hirano noted.

With the planned launch of NASA's Transiting Exoplanet Survey Satellite (TESS) in April this year, Hirano is hopeful that even more planets will be discovered.

"TESS is expected to find many candidate planets around bright stars closer to Earth," he said.

# Modi to attend Manipur Science Congress

**Imphal, Mar 12:** Prime Minister Narendra Modi is scheduled to inaugurate the Science Congress in the Manipur University (MU) campus on March 16, government sources said on Monday.

An official told that at least 5,000 delegates from all over the country will take part in the three-day congress which will be held for the first time in the state.

Chief Minister N.

Biren Singh visited the MU campus on Monday to inspect the preparations in progress.

He said: "I have instructed all officials and contractors to speed up the construction works. Nothing should go wrong and everything should be ready at least one day ahead."

"Out of 5,000 delegates, there are 2,000 scientists," he said.

Police in and around Imphal city

have been carrying out raids and search operations everyday.

Certain villages and residential areas are cordoned off shortly after midnight and all people are checked and verified in the morning.

Persons without proper identification documents are singled out for further verifications.

A police officer said that some militants had been picked up from different parts of the state.

However, no firearm has been seized.

The police plans to round up the armed insurgents ahead of Modi's visit.

N. Biren Singh has instructed the state and central forces to ensure law and order during the visit by the Prime minister.

Additional police personnel and paramilitary forces have been deployed near the MU campus and hotels where the delegates shall stay during the congress.

# Genes too decide how empathetic you are



**London, Mar 12:** Not just upbringing and experience as you age, genes too decide the level of empathy in humans, a team led by an Indian-origin scientist has found.

The study, led by University of Cambridge PhD student Varun Warrior, also said that women are, on average, more empathetic than men.

However, this difference was not due to DNA as there were no differences in the genes that contribute to empathy in men and women.

The research, published in the journal *Translational Psychiatry*, builds on a previous study that also found that women are slightly more empathetic than men.

"This is an important step towards understanding the small but important role that genetics plays in empathy. But keep in mind that only a tenth of individual differences in empathy in the population are due to genetics. It will be equally important to understand the non-genetic factors that explain the other 90 per cent," said.

It also showed that, on average, autistic people score lower on the Empathy Quotient (EQ) -- a brief self-report measure of

empathy -- and that this was because they struggle with cognitive empathy, even though their affective empathy may be intact.

The new study found three important results.

First, the team reported that a tenth of humans' degree of empathy is due to genetic factors -- confirming the previous research that examined empathy in identical versus non-identical twins.

Secondly, it confirmed that women are on average more empathetic than men.

"This implies that the sex difference in empathy is the result of other non-genetic biological factors, such as prenatal hormone influences, or non-biological factors such as socialisation, both of which also differ between the sexes," the study said.

Finally, it found that genetic variants associated with lower empathy are also associated with higher risk for autism.

According to Thomas Bourgeron of the Paris Diderot University, "this new study demonstrates a role for genes in empathy, but we have not yet identified the specific genes that are involved."

# NASA probe to search for interstellar water

**Washington, Mar 12:** NASA's James Webb Space Telescope is set to peer into reservoirs of interstellar water to understand the origin and evolution of key building blocks for habitable planets.

A molecular cloud is an interstellar cloud of dust, gas, and a variety of molecules ranging from molecular hydrogen (H<sub>2</sub>) to complex, carbon-containing organics.

Molecular clouds hold most of the water in the universe, and serve as nurseries for newborn stars and their planets.

Within these clouds, on the surfaces of tiny dust grains, hydrogen atoms link with oxygen to form water. Carbon joins with hydrogen to make methane.

Nitrogen bonds with hydrogen to create ammonia. All of these molecules stick to the surface of dust specks, accumulating icy layers over millions of years.

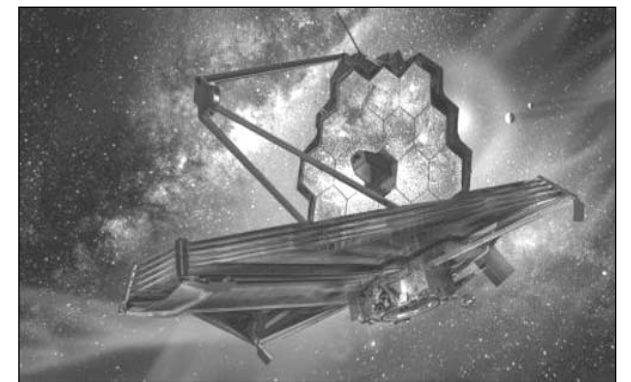
The result is a vast collection of "snowflakes" that are swept up by infant planets, delivering materials needed for life as we know it.

"If we can understand the chemical complexity of these ices in the molecular cloud, and how they evolve during the formation of a star and its planets, then we can assess whether the building blocks of life should exist in every star system," said Melissa McClure of the Universiteit van Amsterdam in Netherlands.

To understand these processes, researchers will examine a nearby star-forming region to determine which ices are present where.

"We plan to use a variety of Webb's instrument modes and capabilities, not only to investigate this one region, but also to learn how best to study cosmic ices with Webb," said Klaus Pontoppidan of the Space Telescope Science Institute (STScI), an investigator on McClure's project.

The project will take advantage of Webb's high-



resolution spectrographs to get the most sensitive and precise observations at wavelengths that specifically measure ices.

Webb's spectrographs, NIRSpect and MIRI, will provide up to five times better precision than any previous space telescope at near- and mid-infrared wavelengths.

The team plans to target the Chamaeleon Complex, a star-forming region visible in the southern sky.

It is located about 500 light-years from Earth and contains several hundred protostars, the oldest of which are about 1 million years old.

The team will use Webb's sensitive infrared detectors to observe stars behind the molecular cloud. As light from those faint, background stars passes through the cloud, ices in the cloud will absorb some of the light.

By observing many background stars spread across the sky, astronomers

They will also target individual protostars within the cloud itself to learn how ultraviolet light from these nascent stars promotes the creation of more complex molecules.

Astronomers also will examine the birthplaces of planets, rotating disks of gas and dust known as protoplanetary disks that surround newly formed stars.

They will be able to measure the amounts and relative abundances of ices as close as five billion miles from the infant star, which is about the orbital distance of Pluto in our solar system.

Comets have been described as dusty snowballs. At least some of the water in Earth's oceans likely was delivered by the impacts of comets early in our solar system's history.

We'll be looking at the places where comets form around other stars," said Pontoppidan.

# Indian-origin researchers develop handy blood pressure app, hardware

**New York, Mar 12:** To get the accuracy of cuff devices and the convenience of mobile device apps, a team led by an Indian-origin researcher has created a new app and hardware to measure blood pressure.

The technology, details of which were published in the journal *Science Translational Medicine* along with a video, also includes a discovery of a more convenient measurement point.

"We targeted a different artery, the transverse palmar arch artery at the fingertip, to give us better control of the measurement," said lead author Anand Chandrasekhar.

"We were excited when we validated this location. Being able to use your fingertip makes our approach much easier and more accessible," Chandrasekhar, a doctoral student at the University of Michigan, added.

The approach uses two sensors -- an optical sensor on top of a force sensor. The sensor unit and other circuitry are housed in a one centimetre-thin case attached to the back of the phone.

Users turn on the app and press their fingertip against the sensor unit. With their finger on the unit, they hold their phone at heart level and watch their smartphone screen to ensure they are applying the correct amount of finger pressure.

"A key point was to see if users could properly apply the finger pressure over time, which lasts as long as an arm-cuff measurement," added senior author Ramakrishna Mukkamala.

"We were pleased to see that 90 percent of the people trying it were able to do it easily after just one or two practice tries," Mukkamala noted.

This invention could give patients a convenient option and keeping a log of daily measurements would produce an accurate average, discounting an occasional measurement anomaly.

# ISRO aims to launch Chandrayaan-2 by April



**Chennai, Mar 12:** The ISRO today said it is aiming for an April launch of the Chandrayaan-2 satellite to the moon, this time it plans to send a rover to explore the lunar surface.

If the April launch of the Chandrayaan-2, the country's second mission to the Moon, is not possible, then the ISRO will aim for a launch by October.

"We are aiming for the launch of Chandrayaan-2 in April. In case we are unable to do so, then we will try for a launch by October," Indian Space Research Organisation chairman K Sivan told reporters here.

The Chandrayaan-2 satellite would comprise an orbiter, lander and

six-wheeled rover which would move around the landing site and instruments on it would send back data that would be useful in analysing the lunar soil.

After reaching the lunar orbit, the Lander housing the rover will separate from the orbiter. After a controlled descent, the lander will soft land on the lunar surface at a specified site and deploy the rover.

Sivan said scientists were also gearing up for the launch of communication satellite GSAT-6 on-board GSLV-F08, scheduled later this month.

"Our immediate plan is a GSLV flight. We are planning to launch it by the end of this month.

After that we plan to launch navigation satellite IRNSS-1L," he said.

The GSAT-6A is a communication satellite which will provide a platform for developing technologies. It would be useful in satellite based mobile communication applications.

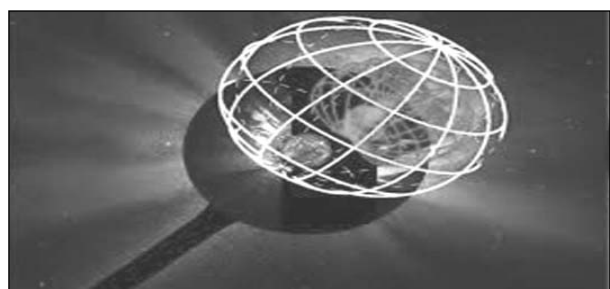
The IRNSS-1L is the eighth satellite to join the NavIC Navigation satellite constellation, which would be sent to a Sub-Geosynchronous Transfer Orbit on-board PSLV as the previous IRNSS-1H launched on August 31, 2017 had become an "unsuccessful" mission.

On asking, Sivan said the ISRO was working on developing a mobile application for the benefit of fishermen.

"We are working on the app (application). It will inform fishermen where large quantities of fish are available. It will also give them messages about the conditions of the sea. It is in production mode (currently)," he said.

In January, the ISRO successfully launched PSLV-C40 carrying Cartosat-2 Series satellite from the spaceport of Sriharikota about 110 km from here.

# Scientists recreate solar eruption in 3D



**New York, Mar 12:** Scientists have combined data from three NASA satellites to develop a 3D model that simulates how shocks following coronal mass ejections (CMEs) propagate from the Sun.

CMEs, often called

solar storms or space storms, are a significant release of plasma and magnetic field from the solar corona.

The CMEs set off interplanetary shocks when they erupt from the Sun at extreme speeds, propelling a wave of

high-energy particles.

These particles can spark space weather events around Earth, endangering spacecraft and astronauts.

The scientists Ryan Young Kwon, solar physicist at George Mason University in

Virginia, and Angelos Vourlidas, astrophysicist from the Johns Hopkins University, fit the CME data to their models -- one called the "croissant" model for the shape of nascent shocks, and the other the "ellipsoid" model for the shape of expanding shocks -- to uncover the 3D structure and trajectory of each CME and shock.

They used data from the NASA/ESA Solar and Heliospheric Observatory (Soho) and NASA's twin Solar Terrestrial Relations Observatory (Stereo) satellites.

Each spacecraft's observations alone were not sufficient to model the shocks.

But with three sets of eyes on the eruption, each of them spaced nearly evenly around the Sun, the scientists could use their models to recreate a 3D view.

Their work confirmed

## HAPPY RETURNS OF THE DAY

### BIRTHDAY GREETINGS

Name : .....

Date of birth : .....

Place : .....

PHOTO



Rahul

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