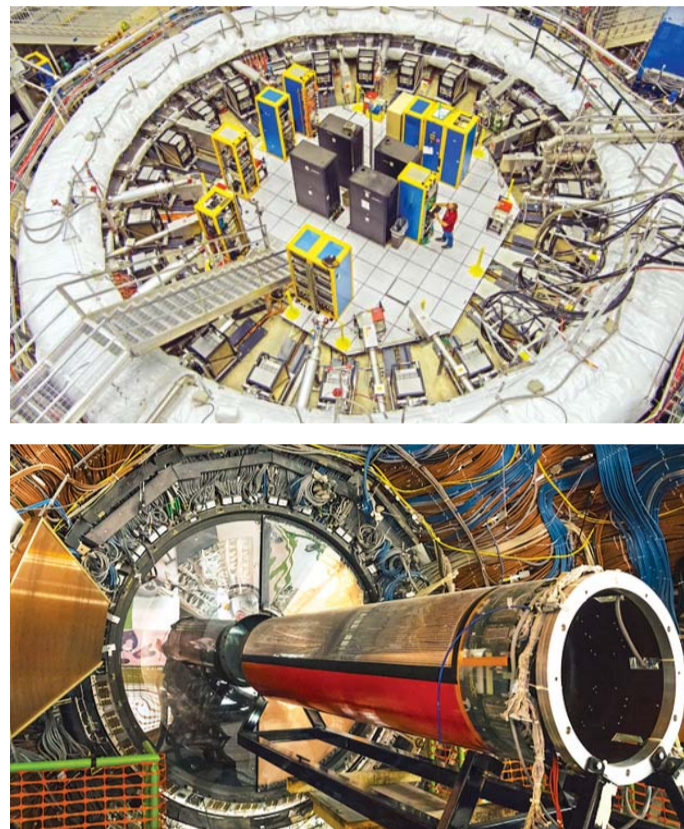


#THEORY

The Fifth Force

Experts closing in on potentially identifying new force after surprise wobble of subatomic particle



The tantalising theory that a fifth force of nature could exist has been given a boost thanks to unexpected wobbling by a subatomic particle, physicists have revealed.

According to current understanding, there are four fundamental forces in nature, three of which – the electromagnetic force and the strong and weak nuclear forces – are explained by the standard model of particle physics.

However, the model does not explain the other known fundamental force, gravity, or dark matter – a strange and mysterious substance thought to make up about 27% of the universe.

Now researchers have said there could be another, fifth, fundamental force of nature.

Dr Mitesh Patel, from Imperial College London, said: "We're talking about a fifth force because we can't necessarily explain the behaviour [in these experiments] with the four we know about."

The data comes from experiments at the Fermilab US particle accelerator facility, which explored how subatomic particles called muons – similar to electrons but about 200 times heavier – move in a magnetic field.

Patel says the muons behave a bit like a child's spinning top, in rotating around the axis of the magnetic field. However, as the muons move, they wobble. The frequency of that wobble can be predicted by the standard model.

But the experimental results from Fermilab do not appear to match those predictions.

Prof Jon Butterworth of University College London, who works on the Atlas experiment at the Large Hadron Collider (LHC) at Cern, said: "The wobbles are due to the way the muon interacts with a magnetic field. They can be calculated very precisely in the standard model but that calculation involves quantum loops, with known particles appearing in those loops. "If the measurements don't line

What A Soft Landing!

In a giant leap for its space programme, Chandrayaan-3 touched down on Moon's South Pole at 6.04 pm on 23rd August, propelling the country to an exclusive club of four and making it the first country to land on the uncharted surface. With this groundbreaking feat, India has secured its place in history as the first nation to successfully land a spacecraft on the Lunar South Pole. The Chandrayaan-3 mission, a testament to India's progress in space technology, has garnered worldwide attention for its audacious ambition and pioneering spirit.



Shruti Kothari

India scripted history on 23rd August with the successful landing of Chandrayaan-3 on the moon's surface. The Chandrayaan-3 lander successfully touched down on the moon's South Pole, thought to be a potential source for water and oxygen, days after Russia's mission failed. The Indian space agency - ISRO - launched the rocket on July 14, blasting off from the country's main spaceport in the southern state of Andhra Pradesh.

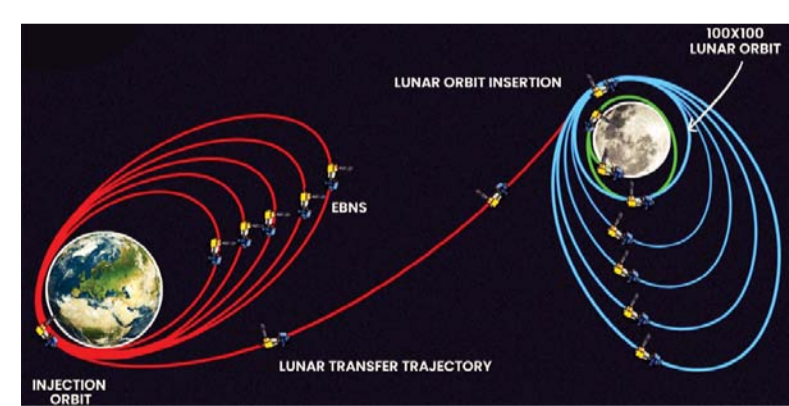
But Patel said there was a "fly in the ointment", noting that between the first results and the new data, uncertainty has increased around the theoretical prediction of the frequency.

That, he said, could shift the situation. "Maybe what they are seeing is standard scientific thinking – the so-called standard model," Patel said.

There are other issues. Butterworth said: "If the discrepancy is confirmed, we will be sure there is something new and exciting but we won't be sure exactly what it is."

"Ideally the discrepancy would inform new theoretical ideas that would lead to new predictions – for example, of how we might find the particle that carries the new force, if that's what it is. The final confirmation would then be building an experiment to directly discover that particle." Butterworth added that the unexpected frequency of the muons' wobbles was one of the longest-standing and most significant discrepancies between a measurement and the standard model.

"The measurement is a great achievement, and very unlikely to be in error now," he said. "So if the theory predictions get sorted out, this could indeed be the first confirmed evidence for a fifth force – or something else strange and beyond the standard model."



said prayers as the spacecraft approached the surface. This was India's second attempt to land a spacecraft on the moon and comes less than a week after Russia's Luna 25 mission failed.

Here, we further take a look at why a 'soft landing' is crucial to the mission, what makes landing on the South Pole a difficult feat, and what happens next.

The Journey
The Chandrayaan-3's journey began from Earth on July 14 when the spacecraft took off from Sriharikota. After this, a few orbit-raising manoeuvres eventually led to its insertion into the lunar orbit on August 5. Slowly, the spacecraft contracted the distance between itself and the Moon's surface before landing on Earth's only natural satellite.

Soft landing simply means landing at a gentle, controlled speed to not sustain damage to a spacecraft. Doing so showcases a spacecraft's technical capabilities. The landing site is near the south pole of the moon at 70 degrees latitude. All of the previous spacecraft to have landed on the Moon have landed in the region near the Moon's equator.

What is a Soft Landing?
According to ISRO, the mission's three objectives are to demonstrate a safe and soft landing on the lunar surface, to demonstrate a Rover roving on the Moon and to conduct in-situ scientific experiments.

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ISRO chairman S. Somanath



Learnings From Chandrayaan-2

Subsequent analyses reported that there were both software and hardware problems in 2019's Chandrayaan-2. ISRO chairperson S Somanath recently said the changes to the current mission were "failure-based." He said, "Instead of a success-based design in Chandrayaan-2, we are doing a failure-based design in Chandrayaan-3 – we are looking at what can go wrong and how to deal with it." Some of the changes that have been made are:

- Chandrayaan-2 lost control over its descent around 7.2 km from the surface of the Moon. Its communications system relayed data of the loss of control up to around 400 m above the surface. The Lander had slowed down to about 580 km/hr when it crashed.
- Lander does not have wheels; it has stilts, or legs, which are supposed to touch down on the lunar surface, the legs of Chandrayaan-3 have been strengthened to ensure that it would be able to land, and stabilise, even at a speed of 3 m/sec, or 10.8 km/hour.
- The prospective landing site has had its range increased. Instead of trying to reach a specific 500mx500m patch for landing as targeted by Chandrayaan-2, the current mission was given instructions to land safely anywhere in a 4kmx2.4km area.
- The Chandrayaan-3 Lander

carried more fuel than Chandrayaan-2. This was done to ensure that the Lander would be able to make a last-minute change in its landing site, if it needed.

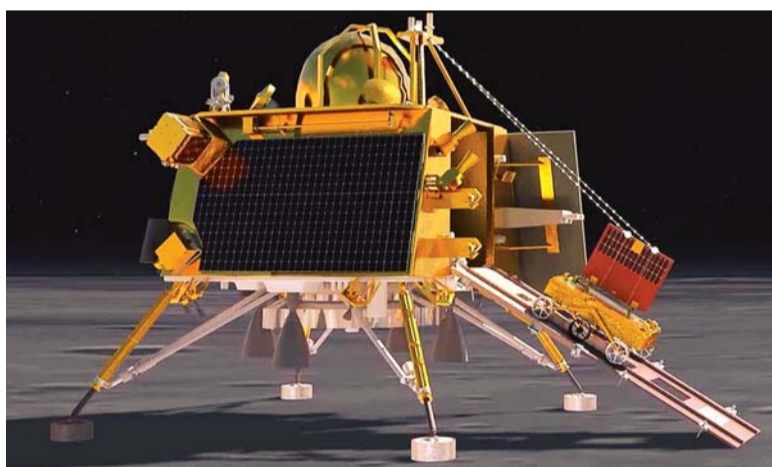
The implications of this achievement are far-reaching. The Lunar South Pole has long remained an enigmatic location, holding the potential for invaluable scientific insights and resource exploration. The ability to explore this region opens avenues for unlocking mysteries of the Moon's history and understanding its geological evolution.

The rover and lander have touchdown on this uncharted region is a testament to the dedication and skill of India's scientific community.

Spacecraft are often carrying certain instruments and experiments with them (called payloads) that observe and record what is happening in Space. This information is then relayed to Earth for scientists to analyse and study.

The six payloads on the Vikram lander and rover Pragyan remain the same as the previous mission. There are four scientific payloads on the lander to study lunar quakes, thermal properties of the lunar surface, changes in the plasma near the surface, and a

#INDIA-ON-THE-MOON



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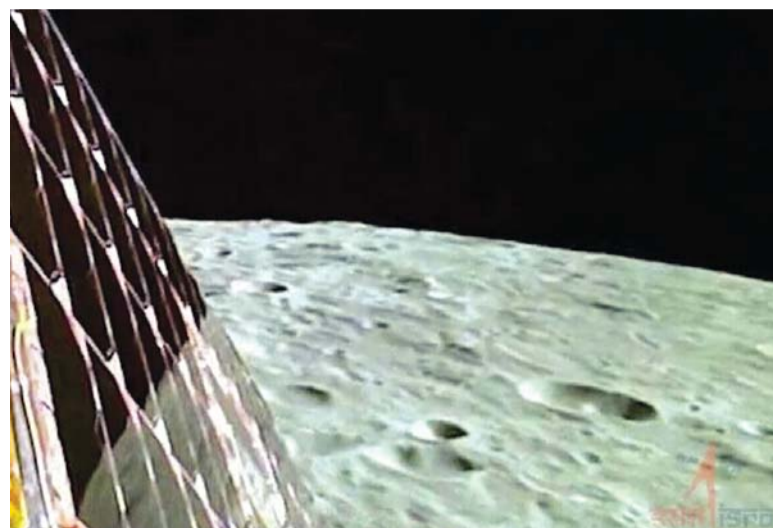


International Overdose Awareness Day

With the increasing drug problem in countries all over the world, in many cases, tragedies happen. For those who suffer from the consequences of overdose, it can be hard for families to cope with the after-effects of what happened. It can also be hard for people who don't understand to find sympathy for those families. International Overdose Awareness Day is all about bridging the gap between those who don't understand and those who know it all too well.



Chandrayaan-3 Lander Module



Chandrayaan-3 First Image of Moon

passive experiment to help accurately measure the distance between Earth and the Moon. The fourth payload comes from NASA.

There are two payloads on the rover designed to study the chemical and mineral composition of the lunar surface and to determine the composition of elements such as magnesium, aluminium and iron in the lunar soil and rocks.

Exploring Moon's South Pole

The Moon's South Pole presents a unique and challenging environment, characterised by rugged terrain, extreme cold, and constantly changing lighting conditions due to its unique axial tilt. ISRO's accomplishment reflects the culmination of years of meticulous planning, advanced engineering, and unwavering determination. The Vikram lander's successful

one more week on the Moon to make their assessments. The South Pole is of particular interest to scientists because Chandrayaan-1 found evidence of frozen water on the dark side of the Moon that cannot be viewed from Earth due to a phenomenon called "Tidal Locking."

Towards New Discoveries

The Chandrayaan-3 mission's success not only elevates India's status in space exploration but also serves as an inspiration for aspiring scientists, engineers, and dreamers across the nation. It underscores the importance of bold ambitions, meticulous planning, and collaborative efforts in pushing the boundaries of human knowledge.

As the nation celebrates this historic accomplishment, the focus now shifts to the scientific discoveries that will emerge from Chandrayaan-3's Pragyan rover on the Lunar South Pole. The data gathered and insights gained will undoubtedly contribute to humanity's broader understanding of the Moon, its formation, and its role in the cosmic tapestry.

The ancient water ice could provide a record of lunar volcanoes, and about material that comes from asteroids brought to Earth. It will also help shed light on how oceans formed. This ice from the lunar South Pole may be used to extract water, oxygen, and fuel for future crewed missions to the Moon.

Indeed, India's achievement with Chandrayaan-3 reinforces the notion that the sky is not the limit, but rather the beginning of a limitless journey into the realms of exploration and discovery.

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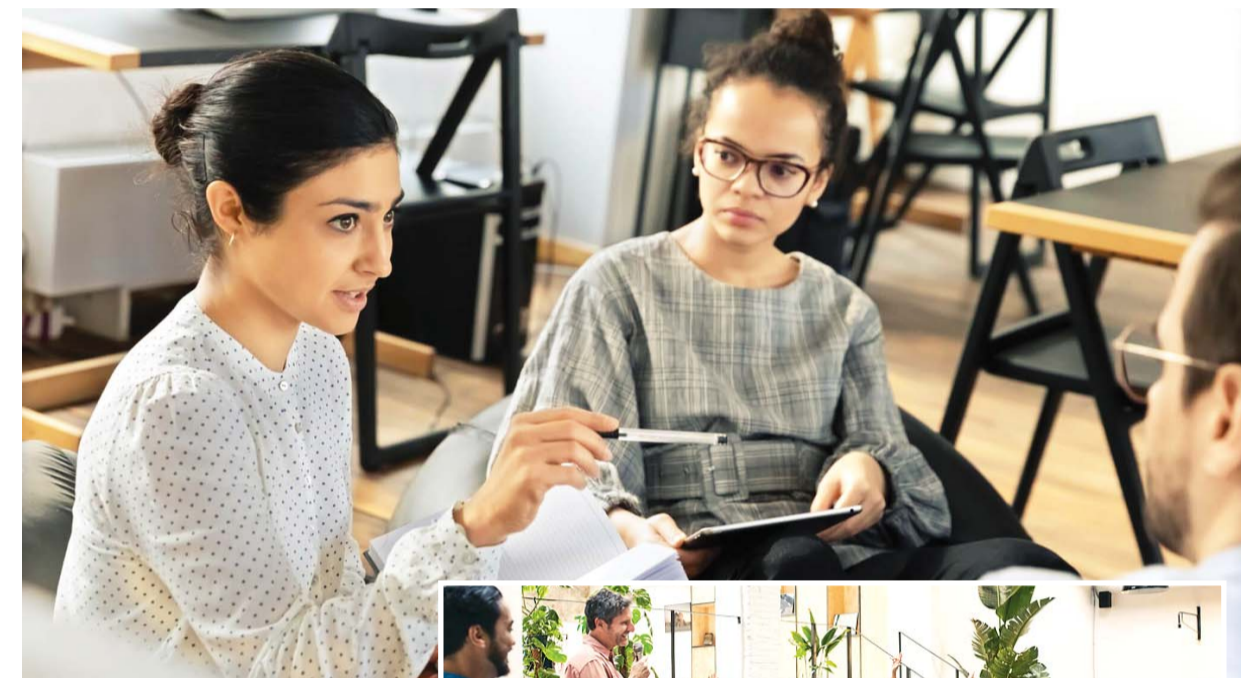


The people behind the Chandrayaan-3 mission

#SKILLS

How To Read The Room Like A Pro

Reading the room is about seeing and hearing what's both spoken and unspoken. And it's a skill well worth mastering.



Chances are, you've been there. You walk into a conference room, dinner party or group of play-ground parents and make a comment that immediately shifts the ballast of the conversation. Eyes dart at you. Their message is clear: Dude, read the room. But you've already said or done something out of sync with what's appropriate in the moment.

While the impulse may be rooted in shyness or social anxiety, people who fail to read the room rarely suffer from passivity. They don't enter as much as barge in. Subtle and restrained are not calling cards. It happens. But it's avoidable. When you're told to – or sense that you should – "read the room," it means that you need to slow down and pick up on the social cues around you. Is someone upset? Having a serious conversation? What is the overall tone? Learning how to read the room is an important skill, one that can be honed by pausing to observe a few key details. Here's how to improve.

Get Comfortable With Silence

Reading the room is about listening, or more precisely shutting up and listening. If you're talking, you're not gathering. Find a partner who's willing and will provide honest feedback. The immediate kind especially helps. When it's positive, you're more likely to repeat the behaviour. When it's negative, you're less likely.

Set a timer for 30 seconds where they talk and you don't. It sounds easy but it will hurt at first because you desperately want to interject. But when you resist that urge, you'll start to become more comfortable with silence. You can start taking in information and learn about the other person; how they feel about the information, and once you enter a room, you're better prepared.

Tune Into Body Language

As in bring your eyes up from the floor. Look at how people's shoulders

are angled. Then notice where their chests are pointing. That's the focus. You also want to notice people's expressions as you listen to what they're talking about, keying in on the paraverbals – the cadence, tone, volume, pace. You put it all together and you can get a sense of the vibe. You'll be able to tell whether someone's response of "great" to "how's it going?" is genuine, happy, sarcastic, or something else.

Notice Your Environment

Pay attention to the acoustics and size. Pay attention to the setting and atmosphere – are things casual, or more formal? Look at the hosts and take a cue from how they're acting. And remember an important fact: "It's not your space". Your job is to fit into it. You might know everyone there, and because people are usually holding something back or couching their terms. It will give you further insight, but more than information, when you're playing detective at

Listen To What People Are Saying

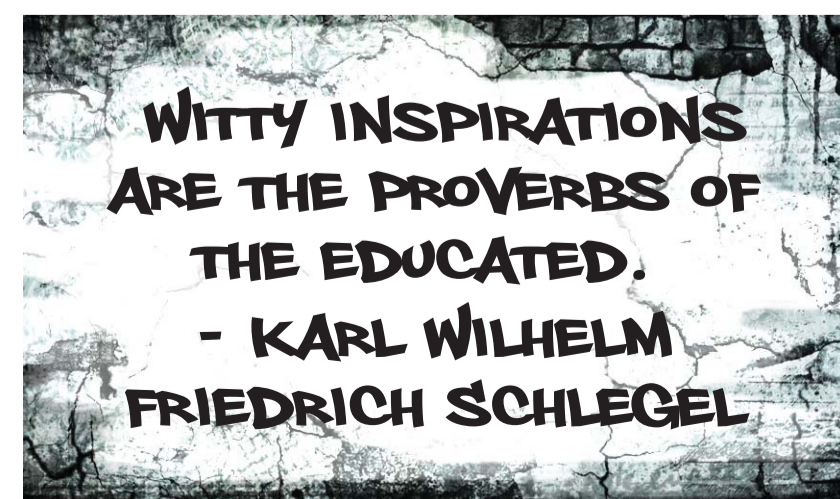
If you've mastered the basics, try to decipher what people aren't saying. What is the overall tone? Learning how to read the room is an important skill, one that can be honed by pausing to observe a few key details. Here's how to improve.

Keep Your Eyes On The Prize

When you're reading a room, you're not looking to be a perpetual observer. The goal is to observe and then engage. You still say "Hi" and smile and answer questions and make small talk. It's more about slowing down your pace, assessing and eventually responding, not with mirroring but calibration. If the tone is sad, you don't have to become sad. You just don't have to tell jokes or talk business.

It'll take time, and you'll make mistakes but because you're trying, they're usually non-fatal. It might feel like too much effort for people you may never see again, but think about those past conversations when someone perfectly gauged the situation and gave you the time and space to talk. That's the impact you can have.

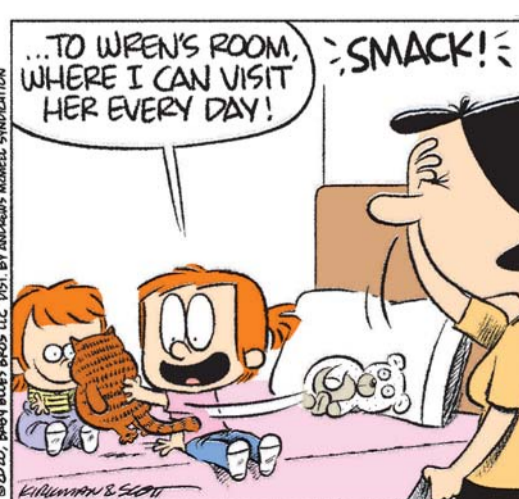
THE WALL



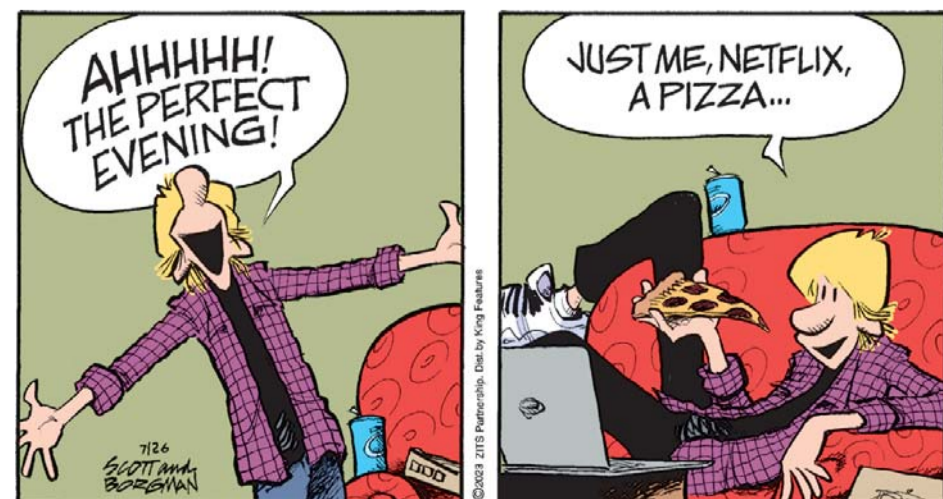
BABY BLUES



By Rick Kirkman & Jerry Scott



ZITS



By Jerry Scott & Jim Borgman

