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समाचार पत्रों से चयनित अंश

Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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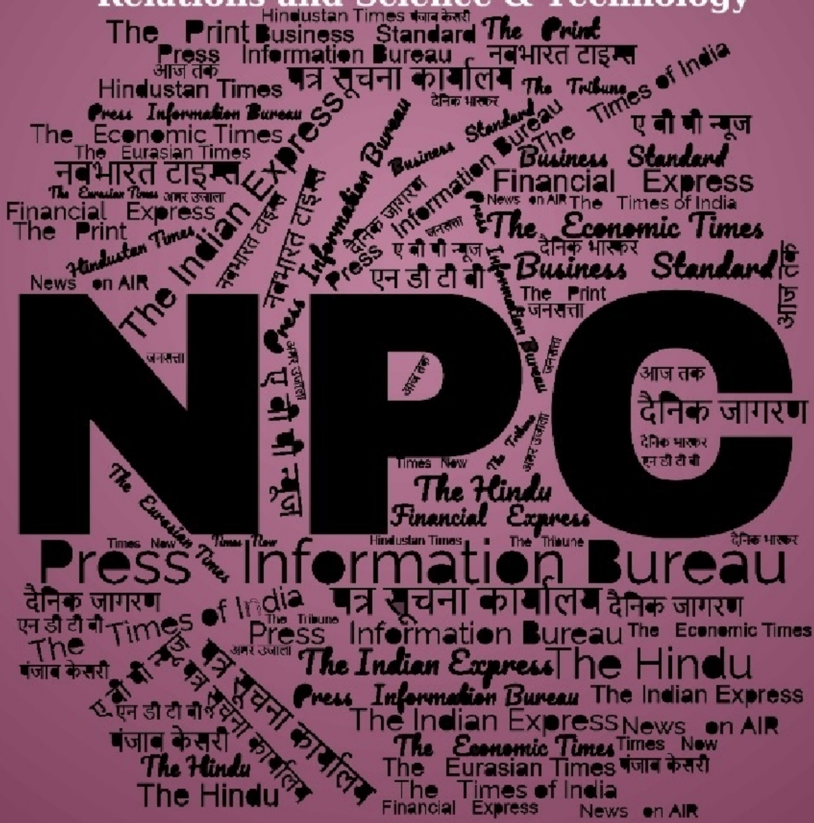

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Defence News

Army plans to deploy thousands of drones over five years

Source: Hindustan Times, Dt. 08 Apr 2026

The Indian Army plans to induct tens of thousands of locally-made unmanned aerial systems and loitering munitions over the next five years to boost its battlefield capabilities, given the growing impact of these systems on military operations and how they have reshaped modern warfare as visible in ongoing global conflicts including the US-Israel war with Iran, officials aware of the matter said on Tuesday.

The army's requirement spans 80 different types of unmanned systems for specific roles including intelligence, surveillance, and reconnaissance, precision strikes, munition dropping, air defence, jamming, mine warfare, data relay, and logistics, one of the officials said, a day after the army released its "Technology Roadmap for Unmanned Aerial Systems and Loitering Munitions." It offers long term visibility of the army's requirements for unmanned systems to the country's industry, academia and research and development institutions. "We are looking at this capability arriving in phases over the next one to five years. In-house studies that factored in lessons from ongoing conflicts indicated a requirement for 30 types of unmanned aerial systems (UAS) and loitering munitions for five broad roles. If the sub-segments are counted, we are talking about 80 different types of drones," said a second official.

Lieutenant General Rahul R Singh, Deputy Chief of the Army Staff (Capability Development and Sustenance), unveiled the technology roadmap weeks after defence minister Rajnath Singh said India must take steps to position itself as a global hub for drone manufacturing by 2030 to meet the country's defence requirements and preserve its strategic autonomy. He said ongoing conflicts, including the war in West Asia, have shown that drones and counter-drone technologies will be central to future warfare. The roadmap aims to harness indigenous capabilities for an edge on the battlefield, the army said. "By clearly laying down technological and operational priorities, the document seeks to serve as a critical bridge between operational requirements and technological development, ensuring that India's drone ecosystem evolves in a structured, demand-driven manner," it added in a statement. The systems required by the army for surveillance include high altitude long endurance UAS, medium altitude long endurance UAS, high altitude pseudo satellites, and unmanned air littoral systems (UALs) for long/medium/short range surveillance, according to the roadmap.

The army is seeking loitering munitions to strike at long, medium and short ranges, drone swarms (for surveillance and strike), and FRV (first-person view) drones with strike capability. It also wants to deploy unmanned systems in special roles, including hunter-killer configured UALs, and systems with guided/unguided bombs. The roadmap aligns with India's plans to raise a drone force under another roadmap, Defence Forces Vision 2047, released in March. The country is preparing to initiate far-reaching military reforms to ensure its armed forces are ready for future battlefield challenges, with the proposed creation of a drone force, a data force and a defence geospatial agency standing out among the raft of goals it seeks to pursue and accomplish by 2047 when it marks its Independence centenary.

https://www.hindustantimes.com/india-news/army-plans-to-deploy-thousands-of-drones-over-five-years-101775591819478.html

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INS Sunayna (IOS Sagar) arrives at Male, strengthening maritime ties with Maldives

Source: Press Information Bureau, Dt. 07 Apr 2026

Indian Navy's INS Sunayna, deployed under Indian Ocean Ship (IOS) SAGAR initiative, arrived at Male on 06 Apr 2026, marking the first port call of her operational deployment. The ship was accorded a warm welcome by the Maldives National Defence Force (MNDF), underscoring a strong and enduring maritime partnership, and close regional ties between the two nations. Notably, two MNDF personnel are also part of the multinational crew embarked onboard.

During transit to Male, the international crew undertook intensive training in seamanship, small arms firing, and damage control drills – reflecting a strong emphasis on collective readiness, operational interoperability, and maritime cooperation. The deployment highlights Indian Navy's continued commitment to strengthening maritime partnerships and capacity building across the Indian Ocean Region, thereby enhancing mutual trust and regional security.

On arrival, Shri G. Balasubramanian, High Commissioner of India to Maldives, visited the ship and interacted with the multinational crew. A range of professional and social interactions and sporting engagements are planned during the port call aimed at fostering closer cooperation and camaraderie. A Passage Exercise (PASSEX) with the MNDF Coast Guard is also scheduled upon the ship's departure.

IOS SAGAR, with international crew from 16 Friendly Foreign Countries (FFCs), is on deployment to the South East Indian Ocean Region, reinforcing India's Neighbourhood First policy and the vision of MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions). The ship was ceremonially flagged off from Mumbai on 02 Apr 2026 by Raksha Rajya Mantri Shri Sanjay Seth. This initiative reflects the enduring vision of 'One Ocean, One Mission,' further strengthening maritime ties between India and its maritime neighbours.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2249747&reg=3&lang=1

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After February grounding, Tejas fleet set to fly again today

Source: The Times of India, Dt. 08 Apr 2026

In what is good news for Indian Air Force (IAF), the indigenously developed LCA Tejas fleet is likely to resume flight operations on Wednesday following a nearly two-month-long grounding. The fleet was grounded in early Feb after a Tejas aircraft suffered a problem during a landing incident.

Hindustan Aeronautics Limited (HAL) CMD D K Sunil recently said that all 36 Tejas jets are likely to resume flying from April 8 after a software-related issue identified in the aircraft was resolved. "There was a technical issue, which has been discussed and committees are working on it. It was discussed in a local modification committee (LMC). Good news is that Tejas, the LMC is done. So, we expect that by Wednesday the fleet will start flying."

Soon after the Feb incident, HAL had stated that it was "not a crash" but a "minor technical incident on the ground". Amid the ongoing conflict in West Asia and Pakistan's repeated threats after Operation Sindoor, it is important for India to keep the Tejas squadrons combat-ready. IAF is already facing a shortage of squadrons, whose number has fallen to 29 as against the 42 required for a two-front war with Pakistan and China.

The Feb incident was the third one involving a Tejas aircraft since its induction in 2016. In March 2024, the fighter faced its first accident near Jaisalmer, when an aircraft crashed while returning from a firepower demonstration. The pilot managed to eject successfully. The second crash happened in Nov 2025 at an aerobatic display at Dubai airshow. The tragic accident killed the pilot, Wing Commander Namansh Syal.

https://timesofindia.indiatimes.com/india/after-february-grounding-tejas-fleet-set-to-fly-again-today/articleshow/130102065.cms

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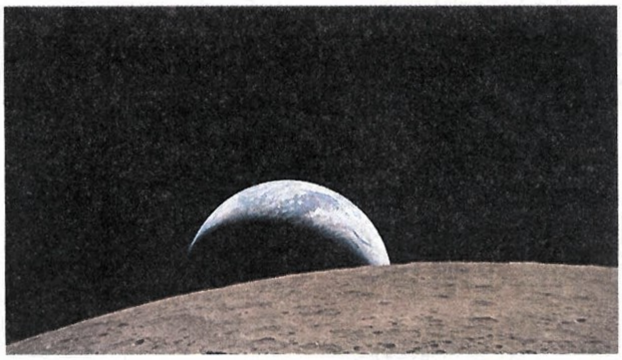
Science & Technology News

आर्टेमिस-II ने चांद के बेहद करीब से भरी उड़ान, अपोलो-13 का रिकॉर्ड तोड़ा

Source: Dainik Jagran, Dt. 08 Apr 2026



ओरियन अंतरिक्ष यान से आर्टेमिस-2 के अंतरिक्षयात्रियों द्वारा सोमवार को लिया गया चित्र, जिसमें चंद्रमा के पीछे आंशिक रूप से पृथ्वी दिख रही है • रायटर

ह्यूस्टन, एपी : धरती से सबसे अधिक दूर जाकर अपोलो 13 मिशन का रिकार्ड तोड़ने के बाद नासा के आर्टेमिस-2 के अंतरिक्षयात्री पृथ्वी पर वापस लौट रहे हैं। आर्टेमिस 2 के चार अंतरिक्षयात्री सोमवार को पृथ्वी से दूर अंतरिक्ष में उस स्थान तक गए, जहां अब तक कोई इंसान नहीं पहुंचा था। अंतरिक्षयात्रियों ने अप्रैल 1970 में अपोलो 13 द्वारा बनाए गए पृथ्वी से 248,655 मील (400,171 किलोमीटर) दूर जाने के रिकार्ड को पार कर लिया। नासा के ओरियन कैप्सूल ने यू-टर्न लेने से पहले पृथ्वी से अधिकतम 252,756 मील की दूरी तय की। 1972 के अपोलो मिशन के बाद पहली बार इंसान चांद के इतने करीब पहुंचा है।

चंद्रमा के सफर के दौरान तीन अमेरिकियों और एक कनाडाई यात्री का स्वागत पूर्ण सूर्य ग्रहण ने किया, क्योंकि चंद्रमा ने कुछ समय के लिए सूर्य को ढक लिया था। बुध, शुक्र, मंगल और शनि ग्रह काले आकाश से उन्हें संकेत दे रहे थे। उन्हें अपोलो 12 और 14 के उतरने के स्थान भी दिखे, जो आधी सदी से भी अधिक समय पहले नासा के अन्वेषण के पहले युग की मार्मिक याद दिला रहे थे। तीन अमेरिकी अंतरिक्षयात्री और एक कनाडाई अंतरिक्षयात्री पिछले सप्ताह ओरियन कैप्सूल में सवार होकर चंद्रमा के सफर पर रवाना हुए थे। इनमें नासा से रीड वाइजमैन, अश्वेत अंतरिक्षयात्री विक्टर ग्लोवर, महिला अंतरिक्षयात्री क्रिस्टीना कोच और कनाडा के अंतरिक्ष संगठन से जेरेमी हैंसन शामिल हैं। जेरेमी हैंसन रेडियो पर कहा ने कहा, यह सचमुच अकल्पनीय है। अंतरिक्षयात्रियों ने चंद्रमा के चक्कर लगाए और 4,067 मील की ऊंचाई से चांद को देखा।

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Why Artemis II crew went farther from Earth than anyone before

Source: The Indian Express, Dt. 08 Apr 2026

The four astronauts of NASA's Artemis II mission on Monday (April 6) travelled 252,756 miles (406,771 kilometers) away from Earth. The Orion spacecraft, in setting the new record, swung around the far side of the Moon. The record before this was the 4,00,171 km travelled by Apollo-13 in 1970, though in that case, the mission had to deviate farther than its intended path due to a malfunction. For Artemis II, the distance was part of the plan, but setting this record is not the mission's main objective. The distance is a function of the path Artemis II is following to fulfill its goals.

What was the Artemis II flight path?

The first crewed lunar mission since December 1972, Artemis II is not a landing mission. Instead, it is a highly regulated flyby designed to test the limits of the Orion spacecraft. While earlier missions like Apollo 8 followed a circular lunar orbit—dictating that the crew fire their engines to maintain a fixed distance from the lunar surface—the Orion spacecraft is flying an elliptical "free-return trajectory." This path relies on the Moon's gravity to naturally slingshot the spacecraft back toward Earth.

How does the 'free-return trajectory' work?

Prioritising crew safety and fuel efficiency, this free-return trajectory is executed in two distinct phases:

The High Earth Orbit (HEO): Initially, rather than aiming directly for the Moon, Orion pushed into an elliptical path around Earth, stretching outward to roughly 74,000 km. This afforded the crew a 42-hour window to conduct critical checks on the environmental control and life support systems

(ECLSS). Should any system have failed here, the spacecraft remained within Earth's gravitational pull, allowing an abort and splashdown within hours.

The Translunar Slingshot: Once cleared for deep space, Orion was pushed toward the Moon by the European Service Module, aiming for a precise point roughly 10,300 km beyond the lunar far side. This allowed the Moon's gravity to act as a tether, catching the spacecraft and whipping it around the far side directly back toward Earth's atmosphere.

What makes this flight plan attractive?

This looping, figure-eight route acts as an uncompromised, passive safety mechanism. It ensures that in the event of an engine failure, the crew does not find itself stranded in deep space. Additionally, this route is exceptionally fuel-efficient. Entering a circular lunar orbit requires a massive, fuel-heavy deceleration burn to get caught in the Moon's gravity, followed days later by an equally massive acceleration burn to break free. Orion's utilisation of gravity to change direction conserves critical propellant.

This lighter fuel requirement reduced the overall mass the Space Launch System (SLS) rocket had to lift off the pad, while ensuring the spacecraft retained a reserve of propellant for potential emergencies.

What next for the Artemis programme?

The primary agenda of Artemis II is to prove that the Orion spacecraft—and its European Service Module—can safely sustain human life in the harsh radiation and isolation of deep space. The 10-day mission's goal was to rigorously verify that the vehicle had the capacity to reach the same distances as the uncrewed Artemis-I while preserving the life of crew members. Orion's safe return will provide NASA with a wealth of telemetry and life-support data to analyse before optimising it for subsequent journeys. Promising a long-awaited return to the Moon, the missions are part of NASA's vision to develop its 'Moon Base'.

https://indianexpress.com/article/explained/explained-sci-tech/artemis-ii-mission-orion-lunar-flyby-10624023/

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Fast Breeder Nuclear Reactor at Kalpakam takes 'critical' leap forward

Source: The Hindu, Dt. 08 Apr 2026

Marking a significant step forward in India's nuclear power programme, Prime Minister Narendra Modi, via a post on X, late on Monday (April 6, 2026), said that the prototype fast breeder reactor (PFBR) at Kalpakkam, Chennai, had achieved 'criticality.' This means that the nuclear reaction in the reactor had become safely self-sustaining and was on its way to being able to produce electricity.

"Today India takes a defining step in its civil nuclear journey advancing the second stage of its nuclear programme…the PFBR at Kalpakkam has attained criticality…it is a decisive step towards harnessing our vast thorium reserves," he posted. While it will be some months before the PFBR is powered up to its full capacity and even longer it produces useful electricity — multiple experiments have to be conducted at low power to check if it is running as expected which must be evaluated by the Atomic Energy Regulatory Board (AERB), which must give its go-ahead for commercial power operation – this is the beginning of the second stage of India’s nuclear programme.

Since it was first formally approved as a project by the government in 2003, it has taken over two decades to reach this stage. India’s nuclear reactors are heavily dependent on importing enriched uranium. India’s three-stage programme, conceived in the 1950s, envisages being able to be independent of imports and be energy secure through the use of thorium, of which has vast stores. The PFBR serves as an essential bridge.

“This is a historic moment,” Anil Kakodkar, Member, Atomic Energy Commission and former head of the Department of Atomic Energy told The Hindu, “What this means is that we are now on our way to extract 80-100 times more energy from a given quantity of uranium.” The PFBR is a 500 MWe sodium-cooled, pool-type fast breeder reactor designed by the Indira Gandhi Centre for Atomic Research (IGCAR) and built by Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI), both operating under the Department of Atomic Energy (DAE).

Unlike conventional thermal reactors, the PFBR uses Uranium-Plutonium Mixed Oxide (MOX) fuel. The core of PFBR is surrounded by a blanket of Uranium-238. Fast neutrons convert fertile Uranium-238 into fissile Plutonium-239, enabling the reactor to produce more fuel than it consumes. The reactor is designed to eventually use Thorium-232 in the blanket. Through transmutation, Thorium-232 will be converted into Uranium-233, which will fuel the third stage of India’s nuclear power programme.

Currently India has a fleet of 18-20 Pressurised Heavy Water Reactors (PHWRs) that use natural uranium as fuel and produce plutonium-239 (Pu-239) as a by-product in spent fuel. India’s full fleet of 23 nuclear reactors have a combined capacity of 7.48 Gwe. In the second stage, plutonium recovered from Stage I spent fuel is combined with uranium-238 in FBRs. These reactors “breed” more fissile material than they consume by converting fertile U-238 into Pu-239 and, eventually, converting thorium-232 into fissile uranium-233 (U-233).

“Beyond energy generation, the fast breeder programme strengthens strategic capabilities in nuclear fuel cycle technologies, advanced materials, reactor physics and large-scale engineering. The knowledge and infrastructure developed through this programme will support future reactor designs and next-generation nuclear technologies,” the science ministry conveyed in a statement.

A significant technological challenge that has led to delays in the PFBR is the use of liquid sodium as a coolant to manage the extremely high heat from fissioning uranium atoms in the PFBR. In India’s current reactors, the heat is largely absorbed by ‘ heavy water’ or in some cases ordinary water. Sodium is a great choice: Its heavier atoms allow fast neutrons to persist and is more suitable for breeding greater quantities of plutonium. It can efficiently remove heat from the reactor core and can keep the reactor safe for longer even if coolant flow is temporarily lost; the range between its melting and boiling is wider than water, meaning larger safety margins. It eliminates the thick, high-pressure containment vessels required by water-cooled reactors, enabling thinner vessel walls and more compact designs and can ultimately, produce more electricity for every unit of heat produced. It also does not corrode the stainless steel reactor components and in fact can protect metals from corrosion, provided the sodium is kept pure and free of oxygen impurities.

On the flip side, sodium is extremely chemically reactive. It burns on contact with air and reacts violently with water, producing sodium hydroxide and hydrogen gas (an explosion risk). This requires sealed, inert-atmosphere systems and rigorous leak prevention. The 1995 Monju accident in Japan, where a sodium leak caused a fire and 15-year shutdown, underscores this risk. Liquid sodium is opaque, making visual inspection of the reactor core impossible. Operators must rely on specialised ultrasonic and electromagnetic inspection and monitoring techniques. The coolant must be kept exceptionally free of oxygen, hydrogen, and carbon impurities. Contaminants can form corrosive compounds or solid precipitates that clog pipes and damage components. The reactor design uses two sodium 'loops,' specialised pumps (including electromagnetic pumps), inert gas cover systems, advanced leak detection, and stringent quality requirements - all of which add to the capital cost and operational complexity compared to conventional water-cooled reactors.

Before achieving criticality, the PFBR was loaded with fuel on October 18, 2025. Once fully operational, the PFBR is expected to generate 500 MWe of electricity with a design life of 40 years. Current plans call for building six FBR-600 units, co-locating two reactors at each site to share common auxiliary systems and reduce costs. The first twin unit is planned at the BHAVINI premises at Kalpakkam, close to the PFBR.

Simultaneously, the Fast Reactor Fuel Cycle Facility (FRFCF) at Kalpakkam, which is designed to reprocess spent fuel from fast breeder reactors, is under construction and is expected to be completed by December 2027. This facility will be essential for closing the fuel cycle and extracting bred plutonium for use in future FBRs, according to documents on the DAE website.

https://www.thehindu.com/news/national/kalpakkam-fast-breeder-reactor-attains-criticality/article70832728.ece

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Classical messaging cannot replace a Quantum Communication Channel

Source: Press Information Bureau, Dt. 07 Apr 2026

A recent study by an international team of researchers reveals a fundamental limitation of classical communication: no finite amount of classical messaging can faithfully simulate a quantum communication channel. This result not only deepens our understanding of the foundations of physics but also carries significant implications for the development of future quantum technologies. Can quantum processes be faithfully reproduced using only classical resources? This deceptively simple question, first asked by Richard P. Feynman in a seminal paper marks the boundary between classical and quantum descriptions of nature and lies at the heart of what we mean by quantum advantage in information processing.

Researchers Sahil Gopalkrishna Naik and Manik Banik from S. N. Bose National Centre for Basic Sciences, an autonomous institution of the Department of Science and Technology (DST), in collaboration with Mani Zartab (Universitat Autònoma de Barcelona) and Nicolas Gisin (University of Geneva), addressed this long-standing question.

They investigated this question in the context of quantum channel simulation in network scenarios. In their study published in journal Proceedings of the Royal Society A (2026) they studied a scenario in which multiple distant parties attempt to reproduce the outcome statistics of quantum measurements at a central location, using only classical communication. While earlier studies had shown that such simulations are possible in simple two-party settings, the new results reveal a sharp breakdown in more complex network configurations. "Our findings show that when multiple senders are involved, no finite amount of classical communication is sufficient to perfectly reproduce the behavior of a quantum channel," said the authors.

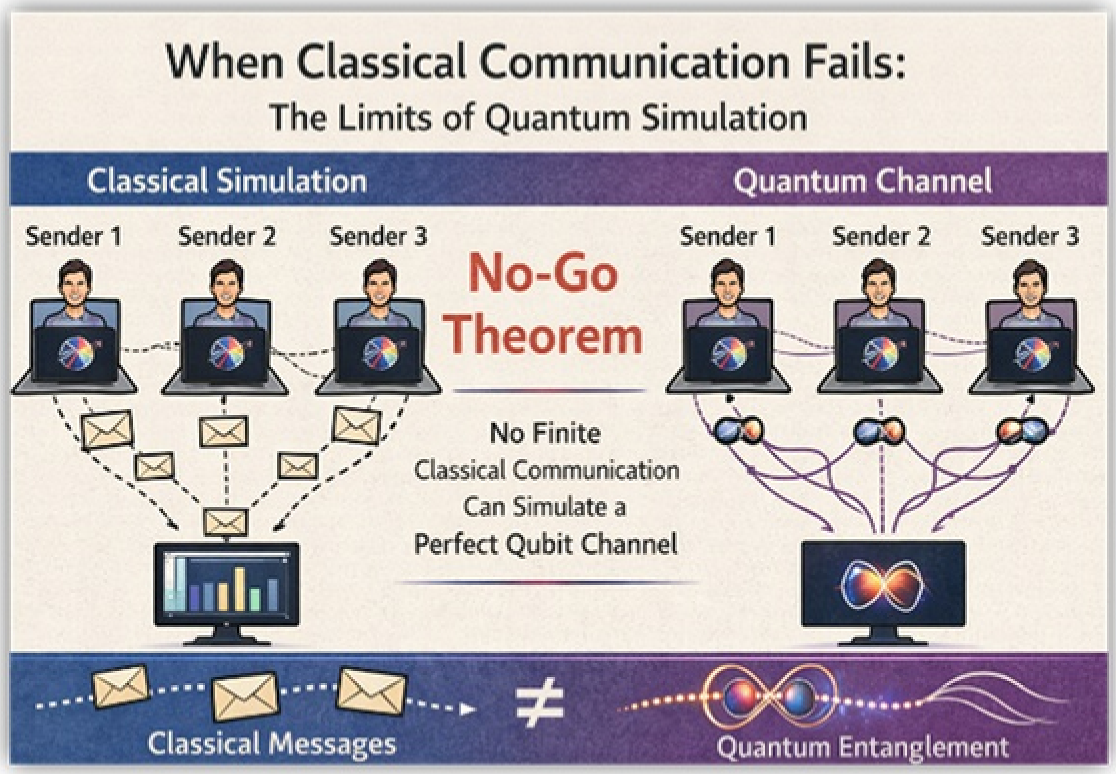

Fig: Distant senders holding privately known qubit states cannot reproduce the measurement statistics at a central node by means of finite amount of classical messaging.

The key challenge arises from the need to account for entangled measurements—a uniquely quantum phenomenon that cannot be replicated using classical means alone. This led establishment of a powerful no-go theorem: a perfect qubit channel cannot be simulated using any finite amount of classical communication, even when allowing the most general multi-round and bidirectional classical protocols.

When several distant parties attempt to reproduce measurement statistics at a central node, the task inevitably requires accounting for entangled measurements—and these cannot be simulated perfectly with any finite classical resources. It is precisely this requirement that drives the no-go result. Beyond its technical significance, the study has important implications for the interpretation of quantum mechanics. It places strong constraints on treatment of quantum state as merely a representation of knowledge. Instead, the results lend support to reflection of quantum state as an underlying physical reality.

The findings also reinforce the notion of quantum advantage—the idea that quantum systems can outperform classical ones in information processing tasks—not just in practice, but in principle. The work highlights that even when quantum states are fully known, their behaviour cannot always be reduced to classical information. Quantum channels, especially in networks, possess an irreducibly quantum character—one that resists any finite classical imitation.

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