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The Tribune

Thu, 03 June 2021

TBRL to conduct critical impact tests on Gaganyaan's crew module

Gaganyaan is a manned orbital spacecraft intended that would form the basis of the Indian Human Spaceflight Programme

By Vijay Mohan

Chandigarh: Terminal Ballistics Research Laboratory (TBRL) here has joined hands with ISRO's Human Space Flight Centre (HSFC) for conducting hypervelocity impact studies on Gaganyaan's crew module.

TBRL, a Defence Research and Development Organisation (DRDO) establishment engaged in ballistic evaluation of missiles, warheads, explosives and other projectiles, will test material specimens against micro-meteoroid and orbital debris (MMOD) found in space.

Gaganyaan is a manned orbital spacecraft intended that would form the basis of the Indian Human Spaceflight Programme being undertaken by the Indian Space Research Organisation (ISRO).

The spacecraft's crew module is being developed by Hindustan Aeronautics Limited.

Located at ISRO's headquarters, HSFC is responsible for implementation of the Gaganyaan project which involves end-to-end mission planning, development of engineering systems for crew survival in space, crew selection and training and associated activities for sustained human space flight missions.

A Memorandum of Understanding for conducting hypervelocity impact studies was signed between TBRL and HSFC recently, under which more than 50 tests are envisaged to be carried out to evaluate critical components of the crew module against MMOD impact, according to DRDO sources.

Hypervelocity impact studies are vital to ensure the safety of crew members during the space mission against the threat posed by the impact of space debris, which have seen an exponential increase around the Earth in the last 60 years.

These orbital debris are moving at such high velocities that even the impact of a flake of paint can cause significant damage to the crew module in the absence of appropriate shielding and protection.

A two-stage light gas gun facility at TBRL, which is the only test facility in India that can achieve a velocity of more than 5,000 metres per second, will be utilised to conduct the hypervelocity impact studies.

Some feasibility tests have already been conducted on dummy targets to establish the internal ballistics parameters and high-speed diagnostics.

<https://www.tribuneindia.com/news/chandigarh/tbri-to-conduct-critical-impact-tests-on-gaganyaans-crew-module-262367>



Build more Scorpene subs while waiting for Project 75-I: Rahul Shrawat

Rear Admiral (Retd) Rahul Shrawat, who heads Naval Group India, talks to Ajai Shukla about Naval Group's ambitions

By Ajai Shukla

New Delhi: The construction of six Scorpene conventional submarines by Mazagon Dock Ltd, Mumbai (MDL) under Project 75, is just 18-24 months from completion. French shipbuilder, Naval Group (formerly DCNS), which has supplied the technology under a \$3.25 billion order, is seeking a bigger role in India. This includes upgrading the six Scorpene with Air Independent Propulsion (AIP) and competing in the \$5.5 billion global tender for building six more AIP submarines under Project 75-I.



Rear Admiral (Retd) Rahul Shrawat, who heads Naval Group India, talks to Ajai Shukla about Naval Group's ambitions. Excerpts:

Q. What is the future of the Project 75 submarine line in Mumbai? Should it build more Scorpene subs or switch to overhauling and upgrading the existing six submarines?

RS: Through extensive transfer of technologies during the construction of six Scorpene submarines, MDL has mastered the building of conventional submarines. This is of great satisfaction for Naval Group. MDL's expertise should not be allowed to fade away, as has happened in the past. These skills must be preserved by building additional submarines in MDL.

If the Ministry of Defence (MoD) orders more Scorpene subs, they can have AIP, which the navy wants. They could also have major capability improvements over the present Scorpene subs, such as advanced weapons and sensors. The final call has to be made by the customer, i.e. the Indian Navy.

Meanwhile, Naval Group is proposing to expand in-service support to the six Scorpene subs through the supply of spare parts and the latest simulators and tools for training and maintenance. For this, we are engaging with private and public Indian companies, as well as the Naval Dockyards. Such service support would also be offered for the six Project 75-I submarines, if that order materialises.

Q. Does Naval Group support the proposal to retro-fit AIP into the existing six Scorpene subs? Has Naval Group made any offer towards this end?

RS: Naval Group fully supports the "Atmanirbhar Bharat" (self-reliant India) initiative on AIP. I understand that the Defence Research & Development Organisation's (DRDO's) indigenously developed, fuel cell-based AIP has successfully demonstrated its performance on a "land-based prototype". We are working closely with DRDO to safely integrate the indigenous AIP into each of the six Scorpene subs, as they come up for long refits.

Q. Would Naval Group suggest ordering additional Scorpene subs, effectively expanding project 75? Or is it preferable for MDL to move straight into building a next-generation submarine under project 75-I?

RS: Building a submarine is much more complex than most other defence platforms. To preserve MDL's building expertise and qualified staff, more submarines need to be ordered quickly. However, the tendering, selection and contracting for Project 75-I is a huge task and requires lead time. In the meanwhile, MDL could build more Scorpene subs, incorporating the DRDO's AIP and other advanced features. This would preserve the expertise created at MDL,

while also bringing orders to Indian firms, such as Bharat Electronics and Larsen & Toubro. However, it is the Indian Navy's prerogative to decide how best to manage this complex issue.

Q. With Project 75 nearing completion, is Naval Group well poised in the tendering for Project 75-I?

RS: Naval Group is honored to have been shortlisted as one of the four global manufacturers in Project 75-I, in the Expression of Interest (EOI) that the Indian Navy floated in 2019.

Naval Group has already, in Project 75, achieved a high level of indigenization through transfer of technology and created a strong industrial eco-system of MSMEs as suppliers. We also have rich global expertise in constructing the latest conventional and nuclear submarines. Naval Group stands ready to propose a solution for Project 75-I that will be fully compliant with the Indian Navy's requirements.

Q. What other products and services is Naval Group looking at the Indian market?

RS: Taking into account Indian Navy's experience and infrastructure at its naval bases, Naval Group is ready to provide services to optimize the availability of Project 75 submarines at sea. For this, we are training Indian maintenance teams, supervised by our domain experts, to perform critical tasks on-board these vessels.

Next, given that torpedoes are the Scorpene's primary underwater armament, we have offered the Indian Navy our latest-generation F-21 heavyweight torpedoes, which we developed for the French Navy's nuclear attack submarines (SSNs). The F-21's capabilities far exceed all other torpedoes currently in service. It has recently demonstrated exceptional performance levels in operational trials and has been recently inducted into the French Navy. The Indian Navy has, therefore, been offered the French Navy's latest torpedoes.

Third, the Indian Navy has an ambitious carrier air programme. Naval Group would like to provide support in building India's second indigenous aircraft carrier (IAC-2), which is currently being designed. We are also in discussion with Indian shipyards for future surface ship programs. Naval Group would also support other future naval platforms with high-end military systems. Should Indian shipyards need this, we can propose full design or technology bricks (for propulsion, combat management systems, etc.) for future complex surface ship projects.

https://www.business-standard.com/article/current-affairs/build-more-scorpene-subs-while-waiting-for-project-75-i-rahul-shrawat-121060201577_1.html

India-China row: Indian Army starts hunt for stealthy, AI-enabled, next-gen Tanks

By Jayanta Kalita

As India, China border standoff drags on, the Indian Army is keen to acquire 1,700 hi-tech Future Ready Combat Vehicles (FRCVs), which are expected to have some AI and stealth features.

The move, part of India's military modernization process, is aimed at replacing the older T-72M/M1 Ajeya main battle tanks.

According to a Request of Information (RFI), the Ministry of Defense has put forward a number of technical requirements. The FRCVs should be able to operate in a wide range of terrains, including on-road and off-road conditions, as well as areas of high-altitude, plains, and deserts.



File Image: Russian T-14 Armata Tank

The RFI published on June 1 says the FRCV must have the capability to destroy a variety of land targets which may comprise Main Battle Tanks (MBTs), armored vehicles, drones, and helicopters. It should be fitted with a remotely operated weapon station and anti-aircraft combat equipment to counter unmanned aerial vehicles (UAVs).

The requirements of the MOD also include some high-end onboard equipment. The FRCV must also be laced with artificial intelligence (AI) and stealth features. It should also be capable of operating in a both network-centric and electronic warfare environment.

ThePrint reported that the procurement process will be done in a phased manner and is expected to be completed by 2030. The procurement process will include a transfer of technology, performance-based logistics, engineering support packages, and other maintenance and training requirements.

The MOD has set a deadline of September 15 to receive replies from prospective vendors.

Ajeya Battle Tanks

The FRCVs will eventually replace the old Russian-designed T- 72 M/M1 Ajeya MBTs, according to Army Recognition.

The T-72 M1 Ajeya is a Russian- made upgraded version of T-72 MBT. Weighing 46,500 kg, its major armaments include one 125 mm 2A46 smoothbore gun, one 7.62 mm PKT machine gun, one 12.7 mm NSVT machine gun along with 12 smoke-grenade dischargers.

The Military Balance 2020 puts the number of MBTs operated by the Indian Army at 3,565. These include 122 Arjun, 2,418 T-72M/M1 Ajeya, 1025 T-90s, and 1,100 tanks of various models.

Till the induction of the FRCVs, the Arjun Main Battle Tanks (MBTs) will continue in their service with the Indian Army.

Arjun MK II

The Arjun MK II or MK 1A is a new generation of MBT. Designed and developed by the Defence Research and Development Organisation (DRDO), it was unveiled at the Republic Day Parade of 2014.

The Arjun MK II is an improvement of the Arjun MBT MK I, and includes features like superior firepower, higher mobility, and better protection. The mobility characteristics of the Arjun

MK II have been found to be useful to be operated in the desert conditions of Rajasthan, and DRDO has recently launched the battle tank for user trials in the state.

Weighing 68 tons, it is equipped with a 120 mm main gun. Its accessories include a laser range finder, a computerized fire control, an auxiliary power unit, thermal night vision and laser warning. Equipped with a GPS navigation system and NBC protection system, the Arjun MK series also has an integrated fire detection and suppression system.

In February 2021, the MOD granted its approval to acquire 118 indigenously manufactured Arjun Mark 1-A or 'hunter-killer'.

The 'hunter-killer' is a new version of the indigenous tanks. In comparison to the Arjun main battle tank (MBT), they have an all-weather capability, better firepower, and stability. It is expected to include 14 major improvements based on Army recommendations.

Major upgrades to the Arjun Mark 1 includes new transmission systems, improved gunner's main sight, integrated automatic target tracking. These upgrades are expected to enable the tank crew to track the moving targets and engage them while the Arjun is still on move.

Its gun is controlled by a computerized integrated fire control system, which enables the tank to have a high first-round kill capability.

<https://eurasianimes.com/india-china-row-indian-army-starts-hunt-for-stealthy-ai-enabled-next-gen-tanks/>

COVID 19: DRDO's Contribution



Press Information Bureau
Government of India

Ministry of Defence

Wed, 02 June 2021 1:18PM

500-bed COVID Care hospital set up by DRDO inaugurated in Haldwani, Uttarakhand

A 500-bed COVID Care Hospital set up by Defence Research and Development Organisation (DRDO) in Haldwani was virtually inaugurated by Chief Minister of Uttarakhand Shri Tirath Singh Rawat on June 02, 2021. This facility comprises 375 oxygen beds and 125 ICU beds with ventilators. With 100 per cent power backup, it is centrally air conditioned for all weather conditions. Pathology laboratory, Pharmacy, X-Ray and ECG etc. are inherent part of the facility. The Centre will become fully operational from June 03, 2021.

A control centre with Wi-Fi, CCTVs and helpline number has also been established for proper monitoring and hospital management through modern system software. Doctors and nursing staff to run the facility would be provided by co-located Government Medical College, Haldwani.

This hospital, which has been built in 21 days, is the result of the efforts of the workforce of 350 persons who worked relentlessly round the clock under adverse weather conditions. This time-bound challenging task involved coordination among various government agencies and arranging mammoth quantity of stores amidst countrywide lockdown. Ample measures have been taken in design and functioning of the hospital to meet any unforeseen challenges in future. Mandatory fire safety norms have been ensured with fire detection alarm system, fire hydrants, and fire-fighting equipment.

In the present COVID situation, this COVID Care Centre will be an invaluable asset for the people of Uttarakhand, providing timely essential medical care during the pandemic. It has been dedicated and named after late General Bipin Chandra Joshi who belonged to Uttarakhand and was the 17th Chief of Indian Army.

Member of Parliament Dr Ajay Bhatt, Minister in Uttarakhand Government Shri Bansidhar Bhagat, Leader of Opposition, Uttarakhand Dr Indira Hridayesh and senior officials of DRDO & state government were present on the occasion.

Raksha Mantri Shri Rajnath Singh has lauded DRDO for its continuous timely assistance during this pandemic. Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy appreciated the relentless efforts of the team involved in the task and thanked the Uttarakhand Government for the support.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723653>





पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 02 June 2021 1:18PM

उत्तराखंड के हल्द्वानी में डीआरडीओ द्वारा स्थापित 500 बिस्तरों वाले कोविड केयर अस्पताल का उद्घाटन

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) द्वारा हल्द्वानी में स्थापित 500 बेड के कोविड केयर अस्पताल का उद्घाटन उत्तराखंड के मुख्यमंत्री श्री तीरथ सिंह रावत ने दिनांक 02 जून, 2021 को किया। इस सुविधा में 375 ऑक्सीजन बेड और वेंटिलेटर की सुविधा वाले 125 आईसीयू बेड शामिल हैं। 100 प्रतिशत पावर बैकअप के साथ सभी मौसमी परिस्थितियों के लिए इस केंद्र में केंद्रीय रूप से वातानुकूलन की सुविधा उपलब्ध है। पैथोलॉजी प्रयोगशाला, फार्मसी, एक्स-रे तथा ईसीजी आदि इस सुविधा का अंतर्निहित हिस्सा हैं। यह केन्द्र दिनांक 3 जून 2021 से पूरी तरह से कार्य करना शुरू कर देगा।



आधुनिक सिस्टम सॉफ्टवेयर के माध्यम से उचित निगरानी और अस्पताल प्रबंधन के लिए वाई-फाई, सीसीटीवी और हेल्पलाइन नंबर के साथ एक नियंत्रण केंद्र भी स्थापित किया गया है। इस सुविधा को चलाने के लिए चिकित्सक व नर्सिंग स्टाफ की व्यवस्था यहीं स्थित राजकीय मेडिकल कॉलेज हल्द्वानी द्वारा की जाएगी।

21 दिन में बना यह अस्पताल प्रतिकूल मौसमी परिस्थितियों के बीच चौबीसों घंटे लगातार काम करने वाले 350 व्यक्तियों के कार्यबल द्वारा किए प्रयासों का परिणाम है। यह समय-बद्ध चुनौतीपूर्ण कार्य विभिन्न सरकारी एजेंसियों के बीच समन्वय एवं देशव्यापी लॉकडाउन के बीच विशाल मात्रा में साजोसामान की व्यवस्था का परिणाम है। भविष्य में किसी भी अप्रत्याशित चुनौती का सामना करने योग्य बनाने के लिए अस्पताल के डिजाइन और कामकाज में पर्याप्त कदम उठाए गए हैं। फायर डिटेक्शन अलार्म सिस्टम, फायर हाइड्रेंट एवं अग्निशमन उपकरणों के साथ अनिवार्य फायर सेफ्टी नॉर्म्स सुनिश्चित किए गए हैं।

कोविड की वर्तमान स्थिति में यह कोविड केयर सेंटर उत्तराखंड के लोगों के लिए एक अमूल्य संपत्ति होगा जो महामारी के दौरान समय पर आवश्यक चिकित्सा देखभाल प्रदान करेगा। इस कोविड केयर सेंटर को नामित तथा समर्पित दिवंगत जनरल बिपिन चंद्र जोशी पर किया गया है जो उत्तराखंड से ताल्लुक रखते थे और भारतीय सेना के 17वें प्रमुख थे।

इस अवसर पर सांसद डॉ. अजय भट्ट, उत्तराखंड सरकार में मंत्री श्री बंसीधर भगत, उत्तराखंड की नेता डॉ इंदिरा हृदयेश और डीआरडीओ तथा राज्य सरकार के वरिष्ठ अधिकारी मौजूद थे।

रक्षा मंत्री श्री राजनाथ सिंह ने इस महामारी के दौरान लगातार समय पर सहायता के लिए रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की सराहना की है। रक्षा अनुसंधान एवं विकास विभाग के सचिव एवं डीआरडीओ के अध्यक्ष डॉ जी सतीश रेड्डी ने इस कार्य में शामिल टीम के अथक प्रयासों की सराहना की एवं साथ देने के लिए उत्तराखंड सरकार को धन्यवाद दिया।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723774>



రక్షణ మంత్రిత్వ శాఖ

Wed, 02 June 2021 1:18PM

ఉత్తరాఖండ్ లోని హల్ద్వానీలో 500 పడకల కోవిడ్ కేర్ ఆస్పత్రిని ఏర్పాటు చేసిన డిఆర్డిఓ

హల్ద్వానీలో డిఫెన్స్ రీసెర్చ్ అండ్ డెవలప్‌మెంట్ ఆర్గనైజేషన్ (డిఆర్డిఓ) ఏర్పాటు చేసిన 500 పడకల కోవిడ్ కేర్ ఆస్పత్రిని 2021 జూన్ 02 న ఉత్తరాఖండ్ ముఖ్యమంత్రి శ్రీ తీరత్ సింగ్ రావత్ ప్రారంభించారు. ఈ సదుపాయంలో 375 ఆక్సిజన్ పడకలు, వెంటిలేటర్లతో 125 ఐసియు పడకలు ఉన్నాయి. . 100 శాతం పవర్ బ్యాకప్‌తో, ఇది అన్ని వాతావరణ పరిస్థితులకు కేంద్రంగా ఎయిర్ కండిషన్ ఏర్పాటు చేసారు. పాథాలజీ ప్రయోగశాల, ఫార్మసీ, ఎక్స్-రే, ఇసిజి మొదలైనవి ఈ సదుపాయంలో అంతర్లీనంగా ఉన్నాయి. ఈ కేంద్రం 2021 జూన్ 03 నుండి పూర్తిగా పనిచేయనుంది.



ఆధునిక సిస్టమ్ సాఫ్ట్‌వేర్ ద్వారా సరైన పర్యవేక్షణ మరియు ఆసుపత్రి నిర్వహణ కోసం వై-ఫై, సిసిటివిలు మరియు హెల్ప్‌లైన్ నంబర్‌తో కూడిన నియంత్రణ కేంద్రం కూడా దీనిలో ఏర్పాటు చేశారు. ఈ సదుపాయాన్ని నడపడానికి వైద్యులు, నర్సింగ్ సిబ్బంది హల్ద్వానీలోని ప్రభుత్వ వైద్య కళాశాల నుండి ఇక్కడ నియమించారు.

21 రోజుల్లో నిర్మించిన ఈ ఆసుపత్రి, ప్రతికూల వాతావరణ పరిస్థితులలో నిర్వీరామంగా పనిచేసిన 350 మంది ఉద్యోగుల కృషి ఉంది. దేశవ్యాప్తంగా లోక్డౌన్ ఉన్నప్పటికీ నిర్దిష్ట కాలంలో పూర్తి చేయాలనే లక్ష్యాన్ని ఒక సవాలుగా తీసుకుని ఈ ఆస్పత్రిని సిద్ధం చేశారు. ఫైర్ డిటెక్షన్ అలారం సిస్టమ్, ఫైర్ హైడ్రాంటు మరియు అగ్నిమాపక పరికరాల ఏర్పాటు వంటి తప్పనిసరి అగ్ని భద్రతా నిబంధనలు పాటించారు.

ప్రస్తుత కోవిడ్ పరిస్థితిలో, ఈ కోవిడ్ కేర్ సెంటర్ ఉత్తరాఖండ్ ప్రజలకు చాలా అమూల్యమైనది. ఇది మహమ్మారి సమయంలో సకాలంలో అవసరమైన వైద్య సంరక్షణను అందిస్తుంది. ఉత్తరాఖండ్‌కు చెందిన, భారత సైన్యం 17 వ చీఫ్ అయిన దివంగత జనరల్ బిపిన్ చంద్ర జోషి పేరు మీద ఇది అంకితం చేశారు.

ఈ కార్యక్రమంలో పార్లమెంటు సభ్యుడు డాక్టర్ అజయ్ భట్, ఉత్తరాఖండ్ ప్రభుత్వ మంత్రి శ్రీ బన్నిధర్ భగత్, ప్రతిపక్ష నేత డాక్టర్ ఇందిరా హృదయేష్, డిఆర్డిఓ & రాష్ట్ర ప్రభుత్వ ఉన్నతాధికారులు పాల్గొన్నారు. ఈ మహమ్మారి సమయంలో నిరంతర సహాయం చేస్తున్న డిఆర్డిఓని రక్షణ మంత్రి శ్రీ రాజనాథ్ సింగ్ ప్రశంసించారు. రక్షణ శాఖ ఆర్ అండ్ డి కార్యదర్శి, డిఆర్డిఓ చైర్మన్ డాక్టర్ జి. సతీష్ రెడ్డి ఈ పనిలో పాల్గొన్న బృందం చేసిన కృషిని ప్రశంసించారు. ఇందుకు సహకరించిన ఉత్తరాఖండ్ ప్రభుత్వానికి ధన్యవాదాలు తెలిపారు.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723825>

DRDO opens 500-bed Covid Care Centre in Uttarakhand's Haldwani

The Covid Care Centre has been dedicated and named after General Bipin Chandra Joshi, PVSM, AVSM, ADC who belonged to state of Uttarakhand and was the 17th Chief of Indian Army

By Manish Prasad

Haldwani: A 500-bed Covid Care Hospital has been set up by Defence Research & Development Organisation (DRDO) in Haldwani. It was inaugurated virtually by Uttarakhand Chief Minister Tirath Singh Rawat on Wednesday. Member of Parliament Dr Ajay Bhatt, Minister Bansidhar Bhagat, Leader of Opposition Dr Indira Hridayesh as well as senior officials of DRDO and Uttarakhand Government.

The Covid Care Centre has been dedicated and named after General Bipin Chandra Joshi, PVSM, AVSM, ADC who belonged to state of Uttarakhand and was the 17th Chief of Indian Army. The Centre will become fully operational from 03 June 2021, DRDO tweeted.



DRDO's 500-bed Covid Care Centre inaugurated in Haldwani. Image Source : DRDO (TWITTER)

This Covid Care facility comprises of 375 oxygen beds and 125 ICU beds with ventilators. With 100% power backup, it is centrally air conditioned for all weather conditions. Pathology laboratory, Pharmacy, X-Ray and ECG etc., are inherent part of the facility.

Mandatory fire safety norms have been ensured with fire detection alarm system, fire hydrants and fire-fighting equipments. A control centre with Wi-Fi, CCTVs and helpline number is also established for proper monitoring and hospital management through modern system software. Doctors and nursing staff to run the facility would be provided by co-located Government Medical College, Haldwani.

This hospital, which has been built in 21 days, is the result of dedicated efforts of workforce of 350 persons who worked relentlessly round the clock under adverse weather conditions.

This time-bound challenging task involved co-ordination among various government agencies and arranging mammoth quantity of stores amidst country wide lockdown. Ample measures have been taken in design and functioning of the hospital to meet any unforeseen challenges in future.

In the present alarming COVID situation in the State and Country, the Covid Care Centre will help the people of Uttarakhand and provide them timely essential medicare amid pandemic.

Union Defence Minister Rajnath Singh has lauded DRDO for its continuous timely assistance during this pandemic.

Secretary DD R&D and Chairman DRDO Dr G Satheesh Reddy appreciated the relentless efforts of the team involved in this very important mammoth task and thanked Uttarakhand Government for all the support.

<https://www.indiatvnews.com/news/india/drdo-500-bed-covid-care-centre-inaugurated-uttarakhand-haldwani-coronavirus-pandemic-updates-news-708752>

DRDO ने ऋषिकेश के बाद हल्द्वानी में बनाया दूसरा कोविड केयर सेंटर, बच्चों के लिए है अलग वार्ड

उत्तराखंड के हल्द्वानी में डीआरडीओ ने अस्थाई कोविड केयर सेंटर बनाया है। कोविड केयर सेंटर में 375 ऑक्सीजन बिस्तर के अलावा 125 आईसीयू बिस्तर और वेंटिलेटर की भी व्यवस्था है। यहां बच्चों के लिए अलग वार्ड के साथ ही अभिभावकों के लिए भी व्यवस्था की गई है।

देहरादून: उत्तराखंड के मुख्यमंत्री तीरथ सिंह रावत ने बुधवार को नैनीताल जिले के हल्द्वानी में डीआरडीओ की तरफ से बनाए गए अस्थाई कोविड केयर सेंटर का उद्घाटन किया। इस सेंटर में 500 बिस्तर हैं। ऋषिकेश के बाद प्रदेश में डीआरडीओ के जरिए बनाया गया ये दूसरा कोविड केयर सेंटर है। अधिकारियों के अनुसार दस हजार वर्गफुट में तैयार आधुनिक सुविधायुक्त जनरल विपिन चंद्र जोशी कोविड केयर सेंटर में 375 ऑक्सीजन बिस्तर के अलावा 125 आईसीयू बिस्तर और वेंटिलेटर की भी व्यवस्था है। यहां बच्चों के लिए अलग वार्ड के साथ ही अभिभावकों के लिए भी व्यवस्था की गई है।



कोविड केयर सेंटर

तीन हफ्ते में तैयार हुआ कोविड केयर सेंटर

मात्र तीन सप्ताह में तैयार हुए इस कोविड सेंटर में ब्लैक फंगस या म्यूकरमाइकोसिस के मरीजों के लिए भी अलग से वार्ड बनाया गया है। सेंटर का क्लीनिकल प्रबंधन डॉ सुशीला तिवारी अस्पताल की तरफ से किया जाएगा। कोविड सेंटर के डिजिटल उद्घाटन के बाद मुख्यमंत्री रावत ने कहा कि केन्द्र और राज्य के समन्वित प्रयासों से ये सेंटर जल्द बनकर तैयार हुआ है। मुख्यमंत्री ने इस कोविड सेंटर की स्थापना के लिए प्रधानमंत्री नरेंद्र मोदी एवं रक्षा मंत्री राजनाथ सिंह का आभार व्यक्त किया। उन्होंने कहा कि हल्द्वानी में कोविड केयर सेंटर बनने से कुमायूं मंडल के लोगों को इलाज मिलने में काफी सुविधा होगी।

तीसरी लहर को लेकर हो रही तैयारी

सीएम रावत ने कहा कि राज्य सरकार की तरफ से स्वास्थ्य सुविधाओं में सुधार के लिए हरसंभव प्रयास किए जा रहे हैं। राज्य में ऑक्सीजन, आईसीयू, वेंटिलेटर और आवश्यक दवाओं की पूर्ण उपलब्धता है। उन्होंने कहा कि कोविड की तीसरी लहर के अनुमान के तहत पुख्ता व्यवस्थाएं की जा रही हैं।

सीएम का जताया आभार

राज्य विधानसभा में प्रतिपक्ष की नेता और स्थानीय विधायक डॉ इंदिरा हृदयेश ने हल्द्वानी में कोविड केयर सेंटर के लिए मुख्यमंत्री रावत का आभार व्यक्त करते हुए कहा कि यहां कुमायूं के अलावा उत्तर प्रदेश से भी अनेक मरीज इलाज के लिए आते हैं। उन्होंने कोविड से लड़ने के लिए सबको मिलजुल कर प्रयास करने की आवश्यकता जताई। डीआडीओ ने हाल ही में 26 मई को ऋषिकेश में भी 500 बिस्तरों वाला कोविड केयर सेंटर तैयार किया था जिसका क्लीनिकल प्रबंधन एम्स ऋषिकेश को सौंपा गया है।

<https://www.abplive.com/states/up-uk/drdo-built-second-covid-care-center-in-haldwani-after-rishikesh-1922039>

Thu, 03 June 2021

Dulloo visits 500-bedded DRDO hospital

Jammu: Financial Commissioner (FC), Health and Medical Education (H&ME) Department, Atal Dulloo visited DRDO hospital at Bhagwati Nagar here today.

During his visit, FC along with Principal GMC Jammu Dr Shashi Sudan Sharma toured the hospital to check the preparedness and facilities being provided in the hospital.

FC inquired about COVID care facilities, which includes the ICU beds, triage, clinical equipment, doctors, paramedics and different offerings for the service of patients.

Dulloo was satisfied with the facilities being provided in the hospital and appreciated the DRDO and Hospital administration for the timely completion of the Hospital.

Thereafter, two patients were admitted in the hospital for treatment of COVID-19.

It is pertinent to mention here that this 500-bedded COVID hospital would strengthen the Government's effort to combat pandemic.

<https://www.dailyexcelsior.com/dulloo-visits-500-bedded-drdo-hospital/>



Financial Commissioner Atal Dulloo during visit to DRDO Hospital at Bhagwati Nagar.

Defence Strategic: National/International



Press Information Bureau
Government of India
Ministry of Defence

Wed, 02 June 2021 7:28PM

Army Chief reviews security in the Kashmir valley

Srinagar, 02 June 2021. General MM Naravane, Chief of Army Staff (COAS) is on a two day visit to Kashmir to review the prevailing security situation in the UT.

On arrival at Srinagar, the Army Chief, accompanied by Lt Gen YK Joshi, the Northern Army Commander and Lt Gen DP Pandey, Chinar Corps Commander visited units and formations in the hinterland where he was briefed by the local Commanders on the existing security situation and the measures being taken to identify & target the over ground workers' (OGWs) network involved in radicalisation and recruitment of youth into terrorist ranks. Efforts to prevent local recruitment and facilitate surrender of local terrorists were also discussed.

While interacting with troops, the COAS expressed his appreciation to the jawans and commanders who are relentlessly battling the dual challenges of Pakistan abetted terror and the global pandemic. He further reinforced the need to be prepared to meet emerging security challenges effectively. Later, the COAS was briefed by the Chinar Corps Commander on the overall situation pertaining to the Line of Control and the hinterland.

The Army Chief complimented the excellent synergy exhibited by all sections of the Civil administration, Jammu and Kashmir Police, Central Armed Police Forces and other Security agencies in projecting a 'Whole of Government' approach that has resulted in improvement in the security situation conducive for fostering a new era of development in the UT.

In the evening, the COAS called on the Hon'ble Lt Governor Shri Manoj Sinha at Raj Bhawan and discussed the emerging challenges and road map for long term peace in J&K. The LG appreciated the role played by the Indian Army in restoring and preserving peace in the UT and providing aid to the civil authorities against the COVID 19 pandemic.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723868>



Thu, 03 June 2021

The Chinese army has been practicing firing on enemies at sea with rockets and anti-tank missiles

By Ryan Pickrell

- *China's military has been practicing striking maritime targets with rockets and anti-tank missiles.*
- *A company commander told state media that these systems are "highly deadly to maritime targets."*
- *The US has also been looking at how to use ground forces to strike and maritime targets.*

The Chinese People's Liberation Army has been conducting live-fire exercises focused on engaging targets at sea with traditional ground combat systems, such as rocket artillery and anti-tank missiles, according to Chinese media.

A brigade with the PLA 80th Group Army recently used PHL-03 long-range multiple rocket launcher systems with a maximum range of up to about 80 miles to fire on various maritime targets, state-affiliated Global Times reported this week, citing state-run broadcaster China Central Television.



Chinese vehicle-mounted multiple rocket launchers fire at mock targets during a tactical live-fire exercise. Chinese Ministry of Defense

The army used long-range drones to conduct reconnaissance in support of the artillery strikes against the sea-based targets, some of which were reportedly mobile.

Capt. Li Yu, a company commander, said that "troops tested multiple tactics and conducted combined strikes on targets, as the exercise further validated these methods and showed long-range multiple rockets are highly deadly to maritime targets," according to Chinese media.

The Global Times, citing state-run Xinhua News Agency, reported that in another exercise, service members from the PLA Army Academy of Artillery and Air Defense used HJ-10 anti-tank weapons against maritime targets in the Yellow Sea.

Chinese military experts told the outlet that the army "showed that they are versatile and can also play roles in anti-ship missions" and that the army can join other services in "joint area denial tasks against hostile warships should they provoke close to China."

The experts argued that these capabilities could also be used to counter an amphibious assault.

The nature of the Asia-Pacific region tends to lead militaries to put greater emphasis on naval combat capability, but in recent years, there has been increased interest in how ground forces can support navies and other elements of the larger joint force and do battle with enemy ships. This has been an important area of research, development, and also experimentation for the US military, which has been looking for options to shatter anti-access/area-denial capabilities with standoff weaponry across the armed forces.

In 2018, the US Army successfully fired a Naval Strike Missile from a Palletized Load System truck, striking a decommissioned ship during the Rim of the Pacific exercise in a first for the service.

The next year, Mark Esper, then the secretary of the Army, suggested that a long-range strategic cannon the Army is interested in could punch holes in Chinese defenses at sea, helping clear the way for the US Navy from positions ashore.

"You can imagine a scenario where the Navy feels that it cannot get into the South China Sea because of Chinese naval vessels or whatever" he explained. "We can - from a fixed location, on an island or some other place - engage enemy targets, naval targets, at great distances."

The US Army has also been pursuing a combat capability known as the Land-Based Anti-Ship Missile that would allow it to go after maritime targets.

More recently, the US Marine Corps fired a missile from its Navy Marine Expeditionary Ship Interdiction System (NMESIS), a combination of a naval strike missile and an unmanned Joint Light Tactical Vehicle known as a Remotely Operated Ground Unit Expeditionary (ROGUE) fires vehicle, and sank a mobile surface target at sea.

"Now, we can move this around on vessels or put it ashore and hold an adversary's navy at risk," Gen. David Berger, commandant of the Marine Corps, told lawmakers in April, adding that this kind of capability allows the US military to "ensure that the lines on the sea are kept open."

NMESIS is one of several lines of effort the Marine Corps has been looking into for engaging maritime threats, something the Corps has begun to prioritize.

The Marine Corps commandant stressed to members of Congress last year that an effective ground-based anti-ship capability "will enhance the lethality of our naval forces and will help to deny our adversaries the use of key maritime terrain."

<https://www.businessinsider.in/international/news/the-chinese-army-has-been-practicing-firing-on-enemies-at-sea-with-rockets-and-anti-tank-missiles/articleshow/83185510.cms>

Thu, 03 June 2021

Detecting mid-infrared light, one photon at a time

For some 30 years, scientists have used superconducting materials to record the tiniest specks of light imaginable—individual photons, or single particles of light. However, these detectors, which consist of ultracold wires only about one-thousandth the diameter of a human hair, were limited to recording single photons at visible-light and slightly longer wavelengths, in the near infrared (IR).

By altering the composition of these nanowires, researchers at the National Institute of Standards and Technology (NIST) and their colleagues have now demonstrated that the devices can efficiently record single photons that have wavelengths up to

10 micrometers (millionths of a meter), five times longer than previously possible. These invisible wavelengths of light, which fall in the mid-IR part of the electromagnetic spectrum (see chart), are emitted when bodies radiate heat. The human body radiates the majority of its heat at 10 micrometers.

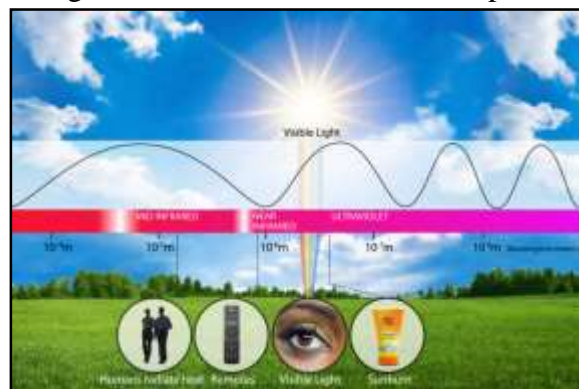
The ability to detect photons at mid-IR wavelengths opens the window on vast new opportunities for research and applications, including an enhanced search for chemical signs of life on other planets, the stealth navigation of vehicles in pitch darkness, and the search for dark matter, the invisible material believed to account for about 80 percent of the mass of the universe.

Earth scientists trying to understand the evolution and changing climate of our planet, as well as astronomers searching for signs of life beyond the solar system, have a particular interest in detecting individual mid-IR photons. That's because many molecules that may indicate biological activity all have a special "fingerprint"—their existence and abundance can be identified by the specific wavelengths of mid-IR light that they absorb.

Astronomers hunting for hints of biological activity beyond the solar system record the extraordinarily faint light of distant stars filtering through the atmosphere of an orbiting planet. If that atmosphere contains possible chemical signs of life—including water vapor, carbon dioxide, oxygen, ozone, methane, and nitrous oxide—the atmosphere will absorb mid-IR photons from the spectrum of light received by telescopes orbiting Earth. Although space-based telescopes already employ conventional mid-IR photon detectors to discern those absorptions, the instruments lack the accuracy of single-photon detectors, which can be critical when light levels are low.

Suppose, for instance, that 10,000 photons emitted by the star travel through a planet's atmosphere. (There's an uncertainty of about 1 percent, or 100 photons, in that photon number.) If that atmosphere contains carbon dioxide, its presence would show up as a dip of about 500 photons at a particular mid-IR wavelength. The photons that do pass all the way through and which reach a detector aboard an Earth-orbiting telescope trigger a flow of electrons that is amplified in order to read out the signal.

Conventional photon detectors have an extra noise component associated with the electronic amplifiers. If the noise produced by the amplifiers produces a spurious signal of 500 electrons,



Credit: Sean Kelly/NIST

there's a big problem: The noise is just as large as the signal (a drop of 500 electrons due to the carbon dioxide in the planet's atmosphere.)

In contrast, the superconducting nanowire detectors have much lower readout noise. When a single photon is absorbed, superconductivity is temporarily destroyed in the device and a small pulse of current is generated that can be easily measured. Other work has shown that this readout technique can give rise to a false click less than 1 time per day.

These single-photon detectors are also stable over extended periods of time, an added bonus for many astronomical studies: Observations of planetary atmospheres typically require detections over several complete orbits.

The nanowires, which have a diameter of only 50 to 100 nanometers, are fabricated from thin films of tungsten silicide, a compound of tungsten and silicon. Cooled to a few degrees above absolute zero, it is superconducting. That means electrons in the wires need only absorb a tiny amount of energy from an incoming photon to generate an electrical signal. The low temperature also limits random electronic noise in the detectors, which is important when sensing such low levels of light.

One of the main challenges in trying to detect mid-IR photons is that each particle of IR light carries much less energy than a visible-light photon does. To compensate for the lower energy, NIST researcher Varun Verma and his colleagues reduced the density of electrons in the wires that are available to absorb the photons. With fewer electrons available, the fraction of the total photon energy absorbed by any one electron is likely to be higher, increasing the likelihood that the electron would have enough energy to cross the superconducting gap and generate a signal when IR photons strike the detector.

The team limited the number of electrons by ramping up the amount of silicon relative to tungsten in the nanowires. (That's because silicon has fewer free electrons and is therefore a poorer conductor than tungsten.) A ratio of two parts silicon to three parts tungsten worked best, the researchers found.

In a recent edition of *APL Photonics*, Varun and his colleagues from NASA's Jet Propulsion Laboratory, MIT, and Lancaster University in the United Kingdom reported that it is possible to observe a saturation of the internal quantum efficiency wavelengths up to 10 micrometers in the nanowires. It is expected that, with refinements to the design, the detection efficiency could be very close to 100%.

To create a nanowire detector large enough to detect mid-IR photons from faint starlight, the NIST researchers must demonstrate that the nanowires can cover a large enough area to fill an IR camera designed for telescope observations. That work is underway.

Meanwhile, the NIST team is collaborating with DARPA on a more immediate application: navigation of a military vehicle under conditions of very low light levels. A tank or military truck traveling at night or underground must do so without betraying its presence to an enemy. Headlights, or even a faint beam bouncing off objects in the dark, are out of the question.

Because the superconducting nanowire devices can record the tiny amounts of mid-IR light naturally emitted by an assortment of objects in the vehicle's path—such as rock, soil, trees, humans, animals or other vehicles—they can provide navigation guidance without tipping off anyone.

The NIST researchers estimate that one of their devices could be installed on a vehicle within the next five years. The team is working to miniaturize the detector's cooling system so that it can easily fit inside a tank or truck.

The superconducting nanowires could, in theory, detect dark matter if the invisible particles interacted with ordinary matter in such a way as to generate mid-IR photons. But because such interactions are rare, researchers would have to build much larger nanowire detectors to see this interaction over reasonable timescales.

More information: V. B. Verma et al, Single-photon detection in the mid-infrared up to 10 μm wavelength using tungsten silicide superconducting nanowire detectors, *APL Photonics* (2021). DOI: [10.1063/5.0048049](https://doi.org/10.1063/5.0048049)
<https://phys.org/news/2021-06-mid-infrared-photon.html>

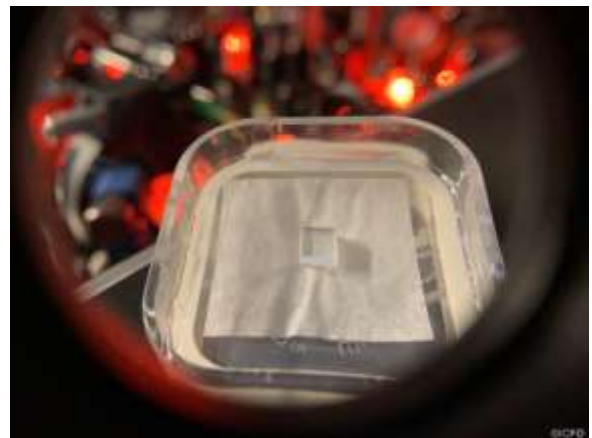


Thu, 03 June 2021

Entangled quantum memories for a quantum repeater: A step closer to the Quantum Internet

During the '90s, engineers made major advances in the telecom arena spreading out the network to distances beyond the cities and metropolitan areas. To achieve this scalability factor, they used repeaters, which enhanced attenuated signals and allowed these to travel farther distances with the same features such as intensity or fidelity. Now, with the addition of satellites, it is completely normal to be in the middle of a mountain in Europe and talk with your loved ones living in the other part of the world.

In the road towards building the future quantum internet, quantum memories play the same role. Together with sources of qubits, they are the building blocks of this novel internet, acting as quantum repeaters of data operations and using superposition and entanglement as the key ingredients of the system. But to operate such system at a quantum level, the entanglement between quantum memories had to be created over long distances and maintained as efficiently as possible.



Close up image of a rare-earth doped crystal used as a quantum memory. Credit: ICFO

All together in one

In a recently published study in *Nature*, ICFO scientists Dario Lago, Samuele Grandi, Alessandro Seri and Jelena Rakonjac, led by ICREA Prof at ICFO, Hugues de Riedmatten, have achieved scalable, telecom-heralded matter-matter entanglement between two remote, multimode and solid-state quantum memories. In simpler words, they were able to store, for a maximum of 25 microseconds, one single photon in two quantum memories placed 10 meters apart.

The researchers knew that the photon was in one of the two memories, but they did not know in which one, which emphasized this counter-intuitive notion that we have of nature, which allows the photon to be in a quantum superposition state in the two quantum memories at the same time but, amazingly, 10 meters apart. The team also knew that the entanglement was created with the detection of a photon at telecom wavelength, and it was stored in the quantum memories in a multiplexed fashion, "a feature akin to allowing several messages to be sent at the same time in a classical channel." These two key features have been achieved together for the first time and define the stepping stone in extending this scheme to much longer distances.

As Dario Lago, a Ph.D. student at ICFO and first author of the study, enthusiastically pinpoints "So far, several of the milestones achieved in this experiment were done by other groups, like entangling quantum memories or achieving storage of the photons in quantum memories with a very high efficiency and high rates. But, the uniqueness about this experiment is that our techniques achieved very high rates and can be extended to longer distances."

Setting up the experiment

Achieving this landmark took its effort and time. During the course of several months, the team setup the experiment, where they used a rare-earth doped crystal as a quantum memory for the basis of their test.

Then, they took two sources generating correlated pairs of single photons. In each pair, one photon, named idler, is at a 1436nm (telecom wavelength), and the other, named signal, is at a wavelength of 606nm. The single signal photons, were sent to a quantum memory, made up of millions of atoms all randomly placed inside a crystal, and stored there via a protocol called atomic frequency comb. Alongside, the idler photons, also called heralding or messenger photons, were sent through an optical fiber to a device called beam-splitter, where the information about their origin and path was completely erased. Samuele Grandi, postdoctoral researcher and co-first author of the study, comments, "We erased any sort of feature that would tell us where the idler photons were coming from, let it be source 1 or 2, and we did this because we did not want to know any information about the signal photon and in which Quantum Memory it was being stored in." By erasing these features, the signal photon could have been stored in any of the quantum memories, which means that entanglement was created between them.

Every time that the scientists saw on the monitor a click of an idler photon arriving at the detector, they were able to confirm and verify that there was, in fact, entanglement. This entanglement consisted in a signal photon in a superposition state between the two quantum memories, where it was stored as an excitation shared by tens of millions of atoms for up to 25 microseconds.

As Sam and Dario mention, "The curious thing about the experiment is that it is not possible to know if the photon was stored in the quantum memory in the lab 1 or in Lab 2, which was more than 10 meters away. Although this was the principal feature of our experiment, and one that we kind of expected, the results in the lab were still counter-intuitive, and even more peculiar and mind-blowing to us is that we were capable of controlling it!"

The importance of heralded photons

Most of the previous studies that have experimented with entanglement and quantum memories used herald photons to know whether or not the entanglement between quantum memories had been successful. A heralding photon is like a messenger dove and the scientists can know upon its arrival that the entanglement between the quantum memories has been established. When this happens, the entanglement attempts stop and the entanglement is stored in the memories before being analyzed.

In this experiment, the scientists used a heralding photon in the telecom frequency, confirming that the entanglement being produced could be established with a photon that is compatible with existing telecom networks, an important feat since it allows entanglement to be created over long distances and, even more so, enables these quantum technologies to be easily integrated into the existing classical network infrastructures.

Multiplexing is key

Multiplexing is the capability of a system to send several messages at the same time through only one channel of transmission. In classical telecommunications, this is a frequent tool used to transmit data over the internet. In quantum repeaters, such technique is slightly more complex. With standard quantum memories, one has to wait for the message heralding the entanglement to come back to the memories, before one can try again to create entanglement. But with the use of the atomic frequency comb protocol, which allows this multiplexing approach, the researchers were able to store the entangled photons at many different times in the quantum memory, without having to wait for a successful heralding event before generating the next entangled pair. This condition, called "temporal multiplexing," is a key feature that represents a major increase in the operational time of the system, leading to an increment in the final entanglement rate.

Future steps

As Prof. ICREA at ICFO Hugues de Riedmatten enthusiastically says, "This idea was conceived more than 10 years ago and I am thrilled to see that it has now succeeded in the lab. The next steps are to bring the experiment outside of the lab, to try and link different nodes together and distribute entanglement over much larger distances, beyond what we currently have now. In fact, we are in the midst of achieving the first quantum link of 35km, which will be done between Barcelona and ICFO, in Castelldefels."

It is clear that the future quantum network will bring many applications in the near future. This achieved landmark proves and confirms that we are in the correct pathway towards developing these disruptive technologies and beginning to deploy them into what will be a new way of communicating, the Quantum Internet.

More information: Telecom-heralded entanglement between multimode solid-state quantum memories, *Nature* (2021). DOI: [10.1038/s41586-021-03481-8](https://doi.org/10.1038/s41586-021-03481-8) , www.nature.com/articles/s41586-021-03481-8

Journal information: *Nature*
<https://phys.org/news/2021-06-entangled-quantum-memories-closer-internet.html>



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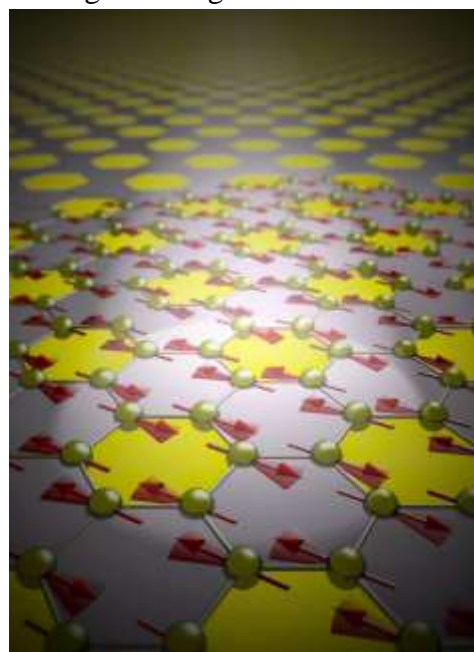
Shining light on two-dimensional magnets

Atomically thin van der Waals magnets are widely seen as the ultimate compact media for future magnetic data storage and fast data processing. Controlling the magnetic state of these materials in real-time, however, has proven difficult. But now, an international team of researchers led by Delft University of Technology (TU Delft) has managed to use light in order to change the anisotropy of a van der Waals antiferromagnet on demand, paving the way to new, extremely efficient means of data storage.

The thin atomic layers that make up van der Waals magnets may seem extremely fragile, but they can be about 200 times stronger than steel. Unfortunately, this mechanical strength does not necessarily translate into strong magnetic properties. The reason for this is that, in two dimensions, the magnetic order of these magnets becomes especially vulnerable to heat. Any temperature above the absolute zero (-273 °C) activates random fluctuations in the orientation of the microscopic spins, which can completely collapse the magnetic order. So until we can control their magnetic state, the promises of atomically thin magnets are just that: promises.

Controlling magnetism

The only way to counteract the thermal agitations is to stick magnetic spins more to some directions in the material than to others. Or, as physicists call it: to induce magnetic anisotropy. Doing so makes it harder for spins to change their orientation, thereby lifting their ordering temperature (known as the Curie temperature) way above absolute zero. Controlling anisotropy in low-dimensional magnets, in other words, paves a direct pathway to controlling their ordering temperature and thus the magnetism itself.



An artistic view of the magnetic spins in the two-dimensional magnet. All spins oscillate in-phase, at a high frequency, in response to the light pulse. Credit: TU Delft

In their study, the international team, which consisted of researchers from the Netherlands, Spain and Ukraine, used ultrashort pulses of light, a trillion times shorter than a single second, to induce the magnetic anisotropy in a two-dimensional van der Waals antiferromagnet. Why use light? "Because it's a very convenient control knob," Dr. Andrea Caviglia explains. "You can simply and swiftly turn it on and off and therefore manipulate the anisotropy on demand, which is exactly what we need if we want to start using these materials for efficient data storage."

Tuning the color

By systematically varying the color of the light from visible to near-infrared, the scientists also found that not every type of light can generate magnetic anisotropy. To induce this property, the color of light needs to match the energy required to change the orbital state of the electron. That is to say: to change the way electron whirls around a positively charged nucleus. As the electron spin and its orbital motion are tightly linked, the light excitations induce anisotropy, which results in a two-dimensional spin-wave motion. "This motion is coherent—the whole spin ensemble moves in-phase at high frequencies," says Jorrit Hortensius, a Ph.D. student at TU Delft. "This is an elegant and at the same time virtually universal solution to manipulating magnetic anisotropy in practically any two-dimensional magnet."

In this proof-of-principle experiment, the team showed that anisotropy can be photoinduced for a tiny fraction of time, nearly the same as the duration of the light pulse. However, for practical applications the changes to the magnet need to be sustained for a longer period of time. The scientists hope that light pulses with a longer-duration might help to reach this goal. Dr. Dmytro Afanasiev, who currently works at University of Regensburg says: "We hope that longer light pulses can even promote the magnetic order above the equilibrium ordering temperature, so that we can watch in real-time how the ordered state arises from magnetic chaos. This will certainly increase our understanding of magnetism in these van der Waals magnets."

The study is published in *Science Advances*.

More information: "Controlling the anisotropy of a van der Waals antiferromagnet with light" *Science Advances* (2021). advances.sciencemag.org/lookup.../1126/sciadv.abf3096

Journal information: [*Science Advance*](#)

<https://phys.org/news/2021-06-two-dimensional-magnets.html>

COVID-19 immunity may last for decades, research suggests

The report indicates that plasmablasts – an early source of antibodies – recede after an infection cleared. What comes after is a longer-lasting source.

People who have recovered from COVID-19 will continue to develop antibodies for decades, researchers now suggest.

According to a report in Nature, researchers from various institutes claim that COVID-19 antibodies can be produced in the bone marrow for long periods after an infection.

“The implications are that vaccines will have the same durable effect,” said Monash University, Australia immunologist Menno van Zelm.

The report indicates that short-lived cells plasmablasts – an early source of antibodies – recede after an infection cleared. What comes

after is a longer-lasting source. Memory B cells continue to patrol the blood for infection while the bone marrow plasma cells continue to secrete antibodies for decades later.

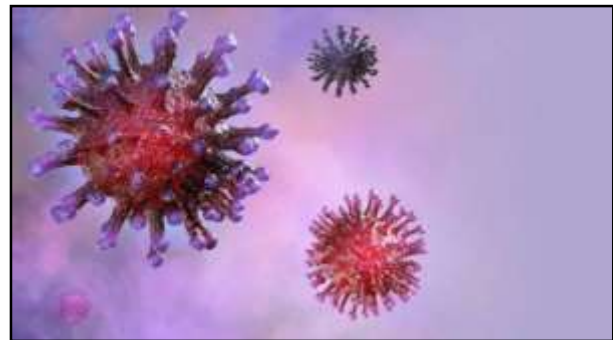
Early studies of the COVID-19 immunity suggested that antibody levels dropped significantly not long after a person recovered from the SARS-CoV-2 infection. However, according to a study led by Ali Ellebedy, a B-cell immunologist at Washington University, the drop slowed. In this study, 77 people who recovered from mild cases of the coronavirus infection were studied and even 11 months after the infection, traces of the antibody could still be detected.

The team collected Memory B cells from the participants, all of which still recognised the SARS-CoV-2 spike protein. The levels were low but were still detectable. Several months later, when the same subset of participants donated another bone marrow sample, the levels remained stable.

While the team observed that Pfizer’s mRNA vaccine had also triggered the production of these antibodies, the persistence of the antibody itself does not ensure long lasting immunity.

“My presumption is, we will need a booster,” says Ellebedy.

<https://www.moneycontrol.com/news/science/covid-19-immunity-may-last-for-decades-research-suggests-6977711.html>



New research suggests that COVID-19 immunity could last for decades

