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The EurAsian Times

Thu, 15 July 2021

LCA Tejas to be powered by new GE-404 Engines; Experts says deal could 'Kill' India's fighter jet program

By Anupama Ghosh

India is likely to acquire 100 fighter jet engines for LCA Tejas in a deal worth $700 million from the US, The Economic Times reported yesterday.

The General Electric (GE) 404 engines will be used on the homegrown MK-1A version of India's Light Combat Aircraft (LCA) Tejas, the report says. IAF has placed an order for 83 Tejas MK-1A jets with the state-run Hindustan Aeronautics Limited (HAL).

The Tejas MK 1, currently in service with the Indian Air Force (IAF), is already equipped with the GE-404 engine.

The HAL Tejas. (via Twitter)

This would be the biggest India-US defense deal since February 2020, when New Delhi and Washington had signed military deals worth $3 billion during the visit of then-US President Donald Trump. The deals included Apache and MH-60 Romeo multi-role helicopters.

India's Homegrown Tejas Fighter

Earlier this year, the Modi government approved a Rs 48,000-crore contract to procure 83 Tejas MK1A fighter jets from HAL.

The HAL Tejas is a single-seat, light-weight, high-agility supersonic fighter aircraft. It is approximately 13.2 m long, 4.4 high, and has a wingspan of 8.2 meters.

The aircraft is equipped with a night vision compatible glass cockpit, which has two color liquid crystal multifunction displays, a head-up display, and a liquid crystal return-to-home-base panel and keyboard.

It also has helmet-mounted display and sight (HMDS), along with a hands-on throttle-and-stick (HOTAS) control system that provides better situational awareness.

The communication suite of the aircraft comprises VHF to UHF radio communications with built-in electronic warfare (EW) suite, air-to-air and air-to-ground data link, as well as a HAL information friend-or-foe interrogator.

Tejas has eight external hardpoints, with three under each wing, and one on the center fuselage, and another under the air intake on the port side.

The Tejas can be equipped with air-to-air, air-to-ground, and anti-ship missiles, precision-guided munitions, rockets as well as bombs. The EW suite of the aircraft, comprises a radar

warning receiver and jammer, laser warner, missile approach warner, and a chaff and flare dispenser.

The aircraft can fly at a maximum speed of 2,205 kmph and at a maximum altitude of 15,200 m. The service ceiling of the aircraft is around 16,500 m.

The Indian defense establishment views the addition of the indigenously built Tejas, "as a game-changer for self-reliance in the Indian defense manufacturing".

According to the contract signed by the HAL in February this year, the company will deliver 73 Tejas MK-1A and 10 Tejas MK-1 trainers by 2026.

India's Defence Minister Rajnath Singh stated that the indigenous content of LCA-Tejas is around 50 percent in MK-1A variant, which will be further enhanced to 60 percent.

The LCA Tejas MK-1A is an advanced version of the LCA MK-1. The new variant would have advanced features such as mid-air refueling, enhanced operational roles, better combat ability, and maintainability through Active Electronically Scanned Array (AESA) Radar, and Beyond Visual Range (BVR) missile capabilities among others.

Fighter Jet Deal With the US

In February 2020, US aerospace giant Lockheed Martin signed a memorandum of understanding (MoU) with the state-owned Bharat Electronics Limited to "explore opportunities in the F-21 fighter jet program".

Lockheed projected the F-21 as an ideal aircraft for the IAF, stating that "in concert with India's Rafale and Tejas, the F-21 will fill a critical operational role for the Indian Air Force".

The US had also offered its F-18 Super Hornets for the Indian Navy, reported The EurAsian Times. The Indian Navy had been eager to acquire 57 naval jets from its aircraft carriers.

It was also reported that the US had offered to sell its F-18 fighters along with the unmanned aircraft Sea Guardian and some other systems. The aircraft offered by the US is an advanced version of the Super Hornets, which was also offered to the Indian Air Force to help augment its requirement of 126 Multirole Medium Combat Aircraft.

The multi-role aircraft is considered one of the most advanced fighters. It can conduct multiple missions in the tactical spectrum such as air superiority, day/night strike with precision-guided weapons, fighter escort, air support, maritime strike, reconnaissance operations, forward air control as well as buddy refueling, according to Boeing.

Will US Deal Hamper LCA Tejas Program?

Some experts were of the opinion that if India acquires US fighter jets, it could undermine the indigenously built Tejas, especially at a time when India has been vociferously pushing for its 'Make-in-India' initiative in the defense sector.

New Zealand-based defense analyst Rakesh Krishnan had stated that if India finalizes its order of 110 American jets, it would be a big blow to the development of Tejas, as due to the limited defense budget, the IAF may curtail its plans to develop two separate fighter programs.

Another expert highlighted the numerous limitations imposed by the US regarding the exports of sensitive technologies, which may in the end result in a reduced capability of the aircraft on offer.

https://eurasiantimes.com/lca-tejas-to-be-powered-by-new-ge-404-engines-experts-says-deal-could-kill-indias-fighter-jet-program/

BusinessToday.In

Thu, 15 July 2021

India set to ink $700 mn fighter jet engine deal with US soon

The American engines already power the Mk1 variant of the Tejas Light Combat Aircraft (LCA) that is already in service with the IAF and would smoothly fit into the latest version of the indigenous fighter

India is all set to ink another major defence deal with the United States (US), to acquire fighter jet engines worth $700 million.

Negotiations are almost over for the engines that will be used to power the homegrown Tejas Light Combat Aircraft (LCA)

Negotiations are almost over for the engines that will be used to power the homegrown Tejas Light Combat Aircraft (LCA).

The Indian Air Force (IAF) will buy a total of 83 jet engines of the LCA Mk1A version from General Electric (GE). All issues pertaining to supply have been straightened out and India will soon place an order for 100 of the GE 404 engines, sources told the Economic Times.

The American engines already power the Mk1 variant of the LCA that is already in service with the IAF and would smoothly fit into the latest version of the indigenous fighter.

The contract with GE is likely to be signed this year. If the deal comes through, this will be the biggest defence deal with the US since February 2020 when India placed orders to procure Apache attack choppers and MH-60 Sikorsky Romeo multi-role helicopters during a visit by then President Donald Trump.

Although the deal doesn't comprise transfer of technology, efforts are underway to build a domestic fighter jet engine for the future Advanced Medium Combat Aircraft (AMCA) programme.

Spearheaded by the Defence Research and Development Organisation (DRDO), the project envisions a partnership either with England or France to together develop critical engine technology in order to power all future air force fighters.

India in February this year inked a Rs 48,000 crore deal to acquire indigenous LCA Tejas Mk1A fighter jets with state-run aerospace major Hindustan Aeronautics Ltd (HAL). The mega order was the biggest ever single defence contract signed with an Indian manufacturer and would include various private sector companies as well.

https://www.businesstoday.in/latest/deals/story/india-set-to-ink-700-mn-fighter-jet-engine-deal-with-us-soon-301298-2021-07-14

Thu, 15 July 2021

Dhruvastra to be tested from LCH in 2022

Dhruvastra, an advanced variant of the Helina anti-tank guided missile that has been designed and developed indigenously by the Defence Research and Development Organisation (DRDO), will be tested from the Hindustan Aeronautics Limited (HAL) manufactured Light Combat Helicopter (LCH) sometime in the next year as HAL starts preparation in adding much awaited and most critical missile system that is desired in any attack helicopter that is ATGM.

Dhruvastra anti-tank guided missile was last tested from Advanced Light Helicopter (ALH)-Rudra platform in desert ranges earlier this year successfully. Post trials, DRDO had said that Dhruvastra is cleared for induction after it successfully demonstrated the missile capabilities in minimum and maximum range, indirect hit mode as well as top attack mode against a static and moving target that was observed by Army and Air force officials.

Advanced Light Helicopter (ALH)-Rudra which is a weaponized variant of the ALH-Dhruv Helicopter that already has been inducted into the Indian Army but remains void of the crucial helicopter-launched version of the third-generation fire and forget class anti-tank guided missile (ATGM) system in its arsenal due to which Army and Air force were not keen on placing orders for Light Combat Helicopter (LCH) without an air-launched anti-tank guided missile in its arsenal.

Industrial sources close to idrw.org have told us that it will be a critical milestone for both Dhruvastra and LCH programs if trials are successful and cleared for production and induction by Army and Air force and come as a major boost to the Made in India platforms. Army and Air force are jointly looking to procure 160 Light Combat Helicopter (LCH) from HAL and many countries are keenly observing the LCH program to meet their demands for Low-cost multi-role attack helicopters in its class.

DRDO also has developed Standoff Anti-tank Guided Missile (SANT) that has been tested from IAF's Mi-35 Attack Helicopters. SANT is equipped with an electro-optical imager (IIR) and a new nose-mounted active radar homing seeker with an extended range of up to 15 km to 20 km. Both Dhruvastra and SANT will be the main helicopter-launched anti-tank guided missile systems on Light Combat Helicopter and ALH-Rudra in near future.

https://www.eletimes.com/dhruvastra-to-be-tested-from-lch-in-2022

COVID 19: DRDO's Contribution

THE TIMES OF INDIA

Thu, 15 July 2021

Four of 38 oxygen plants sanctioned under PM CARES installed so far: Govt review

By Dhritiman Ray

Ranchi: The state department of health, medical education and family welfare has directed the administrations of all 24 districts of Jharkhand to step up the installation work of 38 PSA oxygen plants that have been sanctioned by the Centre under its PMCARES fund in June this year.

In a review meeting, which was held by the department officials, it has emerged that only four out of the 38 sanctioned PSA plants have been installed in the state. These four plants are at Ranchi sadar hospital, Rajendra Institute of Medical Sciences (Rims) in Ranchi, Mahatma Gandhi Memorial Medical College and Hospital (MGMMCH) Jamshedpur and Dhanbad's Shaheed Nirmal Mahto Medical College and Hospital.

PSA plants were sanctioned for medical colleges in Palamu, Hazaribag, Dumka and AIIMS Deoghar, Bokaro General Hospital, sub-divisional hospitals in Bundu, Ghatshila, Sahibganj, sadar hospitals of 20 districts and five community health centres.

As many as 29 of the 38 PSA plants will be installed by the Defense Research and Development Organization (DRDO) while four will be installed by the Centre's Central Medical Services Society. Five of the remaining plants will be installed by the Union health ministry's subsidiary HLL Infratech Services Limited. The site preparations before the installations will be done by Jharkhand government (5 plants), Central Public Works Department (5 plants) and the National Highways Authority of India (NHAI).

"Civil construction works and installation of pipelines are the main causes of the delay in commissioning the plants. That apart, purchase of generator sets and electrification works are also taking time," a senior official in the state health department said.

State health mission director Uma Shankar Singh directed the officials concerned that the installation of pipelines and procurement of generator sets will have to be completed by July 30. "Funds available with the district mineral fund trust, CSR fund, MLA and MP LAD funds must be utilized to complete the works at the earliest," Singh said.

https://timesofindia.indiatimes.com/city/ranchi/four-of-38-oxygen-plants-sanctioned-under-pm-cares-installed-so-far-govt-review/articleshow/84423725.cms

जागरण

Thu, 15 July 2021

दादरी के सरकारी अस्पताल में रविवार से शुरू होगा आक्सीजन उत्पादन, तैयारियां पूरी

चरखी दादरी दादरी शहर स्थित सरकारी अस्पताल में स्थापित किए जा रहे आक्सीज

चरखी दादरी: दादरी शहर स्थित सरकारी अस्पताल में स्थापित किए जा रहे आक्सीजन प्लांट से रविवार से उत्पादन शुरू होने की संभावना है। डीआरडीओ के माध्यम से इस प्लांट में लगाए जाने वाले उपकरण रात तक पहुंच जाएंगे। दिल्ली से विशेष वाहन उपकरणों को लेकर रवाना हो गया है।

सरकार के निर्णय के अनुसार दादरी के जिला नागरिक अस्पताल में आक्सीजन प्लांट लगाने का कार्य किया जा रहा है और एनएचएआइ द्वारा प्लांट का सिविल और इलेक्ट्रिकल कार्य पूरा कर दिया गया है। इस प्लांट में आक्सीजन के उत्पादन के लिए लगने वाले उपकरण डीआरडीओ द्वारा लगाए जाने हैं।

एनएचएआइ के अधिकारियों के अनुसार उपकरण रात तक दादरी पहुंच जाएंगे। डीआरडीए द्वारा विशेष वाहन से उपकरण दादरी के लिए रवाना कर दिए गए हैं। उपकरणों के साथ डीआरडीओ के विशेषज्ञों की टीम भी आ रही है जो मौके पर इनको स्थापित करेगी और प्लांट की शुरुआत करवाएगी।

इस प्लांट की क्षमता 500 लीटर प्रति मिनट होगी और अस्पताल के वार्डों में पाईप लाईन के माध्यम से भर्ती मरीजों को आवश्यकता अनुसार आक्सीजन दी जाएगी। गौरतलब है कि कोरोना की दूसरी लहर के दौरान जिला दादरी सहित सभी क्षेत्रों में आक्सीजन की काफी जरूरत महसूस की गई थी।

कई स्थानों पर आक्सीजन की उपलब्धता में परेशानी का सामना भी करना पड़ा था। पिछले काफी समय से कोरोना की तीसरी लहर आने की बात की जा रही है। सरकार ने भी इसका अंदेशा लगाते हुए नागरिक अस्पताल में आक्सीजन प्लांट लगाने का निर्णय लिया और अब रविवार से आक्सीजन का उत्पादन शुरू होने के बाद भविष्य में इससे काफी राहत मिलने की संभावना है।

https://www.jagran.com/haryana/bhiwani-oxygon-production-will-be-start-from-sunday-in-civil-hospital-21832060.html

जागरण

Thu, 15 July 2021

लखीसराय में प्रति मिनट पांच सौ लीटर आक्सीजन होगा तैयार

आने वाले समय में जिले में आक्सीजन की कमी नहीं होगी। कोरोना काल में आक्सीजन की कि

लखीसराय: आने वाले समय में जिले में आक्सीजन की कमी नहीं होगी। कोरोना काल में आक्सीजन की किल्लत को देखते हुए केंद्र सरकार ने सदर अस्पताल में आक्सीजन प्लांट लगाने का निर्णय लिया है। सरकार ने सदर अस्पताल में आक्सीजन प्लांट लगाने की जिम्मेदारी चार विभाग को दी गई है। इसमें बिहार मेडिकल इन्फ्रास्ट्रक्चर लिमिटेड, एनएचएआइ, डीआरडीओ एवं विद्युत विभाग शामिल है। सदर अस्पताल में पांच सौ लीटर आक्सीजन प्रति मिनट तैयार करने वाली क्षमता का प्लांट लगाया जा रहा है। सदर अस्पताल परिसर में प्रसव कक्ष एवं ड्रग इंस्पेक्टर कार्यालय के बीच स्थित खाली जमीन में बुधवार से आक्सीजन प्लांट लगाने का कार्य शुरू कर दिया गया है। इसके तहत विद्युत विभाग दो सौ केवीए का ट्रांसफार्मर लगा रहा है। एनएचएआइ ने भवन निर्माण का कार्य शुरू कर दिया है।

आक्सीजन प्लांट निर्माण में होने वाले कार्य

विद्युत विभाग आक्सीजन प्लांट में दो सौ केवीए का ट्रांसफार्मर अलग से लगाया जा रहा है। इसके बाद आक्सीजन प्लांट में विद्युत व्यवस्था सु²ढ़ करने को लेकर विद्युत तार वायरिग का कार्य किया जाएगा। एनएचएआइ द्वारा आक्सीजन प्लांट का भवन निर्माण किया जाएगा। बिहार मेडिकल इंफ्रास्ट्रक्चर लिमिटेड दो सौ केवीए का जेनरेटर एवं आक्सीजन प्लांट से सदर अस्पताल के विभिन्न वार्ड में पाइप लाइन बिछाने का काम करेगा। आक्सीजन प्लांट को लेकर भवन निर्माण का कार्य पूर्ण होने के बाद डीआरडीओ द्वारा आक्सीजन तैयार करने से लेकर मशीन एवं अन्य उपकरण लगाएगा। सदर अस्पताल में 143 बेड को आक्सीजन पाइप लाइन से जोड़ा जाएगा।

सदर अस्पताल में जल्द ही आक्सीजन प्लांट बनकर तैयार हो जाएगा। प्रति मिनट पांच सौ लीटर आक्सीजन तैयार किया जाएगा। जब भी आक्सीजन की जरूरत होगी तैयार किया जाएगा। जिले में आक्सीजन की कमी नहीं होगी।

मु. खालिद हुसैन, डीपीएम, जिला स्वास्थ्य समिति, लखीसराय।

https://www.jagran.com/bihar/lakhisarai-lakhisarainews-21830346.html

अमर उजाला

Thu, 15 July 2021

लेवल-1 के तौर पर काम करेगा एमसीएच गांधीनगर

जम्मू: कोविड की तीसरी लहर से निपटने के लिए एमसीएच (जच्चा-बच्चा) अस्पताल गांधीनगर जीएमसी जम्मू की तर्ज पर लेवल-1 के रूप में काम करेगा। इसके लिए बुनियादी ढांचे को मजबूत बनाया जा रहा है। अस्पताल में कोविड संक्रमित के अलावा सामान्य मरीजों को सर्जरी के साथ अन्य चिकित्सा सुविधाएं मिलेंगी। अस्पताल के तीसरी और चौथी मंजिल को सेंट्रल वातानुकूलित किया जा रहा है, ताकि मरीजों को राहत मिल सके। तीसरी लहर की सूरत में इस अस्पताल को पूरी तरह से कोविड अस्पताल के तौर पर प्रयोग में लाने की योजना है।

कोविड की पहली लहर में 200 बिस्तर वाले एमसीएच अस्पताल गांधीनगर में क्वारंटीन और सामान्य श्रेणी के कोविड संक्रमित मरीजों को रखा गया। दूसरी लहर में चिकित्सा सुविधाओं का विस्तार कर इस अस्पताल में प्रसव के साथ अन्य सर्जरी शुरू की गईं। कोविड के पीक पर रहने पर इस अस्पताल में 150 से अधिक मरीज एक साथ भर्ती रहे। लेकिन तीसरी लहर से निपटने के लिए अस्पताल को लेवल-1 के तौर पर तैयार किया जा रहा है। अस्पताल में डीआरडीओ की ओर से 1000 एलपीएम (लीटर प्रति मिनट) की क्षमता वाले ऑक्सीजन जनरेशन प्लांट को स्थापित किया जाएगा। इसमें नेशनल हाईवे अथारिटी की ओर से सिविल कार्य किए जाएंगे। इससे पहले अस्पताल में अपना 1000 एलपीएम वाला आक्सीजन जनरेशन प्लांट है और गांधीनगर पुराने अस्पताल से भी 1000 एलपीएम ऑक्सीजन की सप्लाई ली जा रही है।

निकू, पिकू यूनिटों का विस्तार होगा

अस्पताल के अधीक्षक डॉ. अरुण शर्मा ने बताया कि तीसरे और चौथे फ्लोर में वातानुकूलित का काम जुलाई के अंत तक खत्म करने का लक्ष्य रखा गया है, जिससे पूरा अस्पताल वातानुकूलित हो जाएगा। निकू, पिकू यूनिट का विस्तार किया जा रहा है। वर्तमान में अस्पताल में 172 बिस्तर कोविड मरीजों के लिए रखे गए हैं। मौजूदा अस्पताल में एकमात्र ही कोविड संक्रमित मरीज भर्ती है।

https://www.amarujala.com/jammu/health-development-jammu-news-jammu-city-news-jmu2394677188

दिव्य हिमाचल
देवभूमि का सर्वाधिक लोकप्रिय मीडिया

Thu, 15 July 2021

शाहबाद अस्पताल में लगेंगे 70 नए बिस्तर

By बृज मोहन

शाहबाद: जिला सिविल सर्जन संत लाल वर्मा ने कहा कि शाहबाद के सिविल अस्पताल के नए भवन में 70 नए बैड का प्रावधान होगा। इस अस्पताल के नए भवन में आपरेशन थियेटर, एक्सरे रूम सहित मरीजों के लिए आधुनिक सुविधाएं उपलब्ध करवाने का प्रयास किया जा रहा है। इस अस्पताल में केंद्र सरकार की तरफ से डीआरडीओ द्वारा आक्सीजन प्लांट का निर्माण कार्य शुरू कर दिया गया है। सीएमओ डा. संत लाल वर्मा शहबाद सिविल अस्पताल का निरीक्षण करने के उपरांत पत्रकारों से बातचीत कर रहे थे। इससे पहले सीएमओ ने शाहबाद अस्पताल के आपातकालीन कक्ष, एसएमओ कार्यालय, स्टाफ कार्यालय के साथ-साथ ओपीडी व अन्य कक्षों का अवलोकन किया और निर्माणाधीन आक्सीजन प्लांट का भी निरीक्षण किया।

इस दौरान सीएमओ ने अस्पताल में कई लोगों को बिना मास्क के देखा और मौके पर ही एसएमओ को सख्त आदेश दिए कि अस्पताल में बिना मास्क वाले किसी भी व्यक्ति की एंट्री नहीं होगी, इसमें अस्पताल का स्टाफ और आमजन भी शामिल है। इस मौके पर डाक्टर कुलदीप भी मौजूद थे।

https://www.divyahimachal.com/2021/07/70-new-beds-will-be-set-up-in-shahbad-hospital/

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Wed, 14 July 2021 5:59PM

147 Additional Indian Army women officers granted permanent commission

Consequent to the landmark judgement of the Hon'ble Supreme Court for grant of Permanent Commission (PC) to Women Officers in Indian Army, a Special Number 5 Selection Board for screening Women Officers for grant of PC was constituted in September 2020 and results were declared in November 2020. Further, in March 2021, the Hon'ble Supreme Court had directed to re-consider some cases of Women Officers who were not granted PC by laying down revised parameters for grant of PC.

The Women Officers were re-considered as per directions of the Hon'ble Supreme Court and fresh results have now been de-classified. Consequently, 147 more Women Officers are being granted PC, taking the total PC granted to 424 out of the 615 officers considered. Results of few Women Officers have been withheld for administrative reasons and awaiting outcome of the clarification petition filed by the UOI in the Hon'ble Supreme Court.

All Women Officers granted PC would undergo special training courses and challenging military assignments to empower them for higher leadership roles in the Indian Army. A batch of 33 Women Officers has already successfully completed the Mid Level Tactical Orientation Course from Army War College Mhow recently.

Further, all Women Officers who were considered in this Special Number 5 Selection Board and not granted PC, will yet be eligible for pension subject to serving for a minimum of 20 years in service. Some Women Officers who have already served for 20 years have been released with pension, while others will be allowed to continue to serve till 20 years and would be released with pension.

PC to Women Officers in junior batches has also commenced from December 2020, in which they are considered for PC in their 10th year of service. With grant of PC, the Women Officers are transcending into an era of gender parity and are gearing up to assume challenging leadership roles, akin to their male counterparts.

https://pib.gov.in/PressReleasePage.aspx?PRID=1735484

ANI
South Asia's Leading Multimedia News Agency

Thu, 15 July 2021

DMA to first seek govt nod for initiating process for creation of theatre commands, structures later

New Delhi [India], July 14 (ANI): Amid the ongoing process for the creation of new integrated theatre commands, the Defence Ministry would be first seeking approval from the government to initiate the process for the creation of new formations.

The case for creation of the new integrated theatre commands is being led by the Department of Military Affairs under Chief of Defence Staff General Bipin Rawat.

"The first step would be to get the government approval for initiating the process for the creation of these commands. Once that step is complete, respective officials from the three services would be asked to discuss and create the structures for creation of theatre commands," government sources told ANI.

As per plans, DMA plans to set up four theatre commands along with the air defence command.

The theatre commands would be above the 17 existing operational commands of the three services at different locations.

The Army will have three theatre commands while the Navy will have one. The Indian Air Force (IAF) would be given charge of the air defence command.

There is no urgency in the creation of the theatre command structures and the effort would be to get approval of the government for creating new structures.

The officers given the charge would be senior officers from the three services and would serve till their superannuation.

India is working for creating war-fighting theatres which would be solely responsible for specific areas.

The Army officers will be heading land-based commands in Eastern and Western theatres, while North is being left alone at the moment, according to the Army plans.

The Navy would lead the maritime theatre command while the IAF officers would be leading the air defence command.

The three forces are still discussing the issue among themselves to enhance coordination among the three services in times of war.

The first step in the direction of the theatre commands was the creation of the post of the Chief of Defence Staff on January 1, 2020. (ANI)

https://www.aninews.in/news/national/general-news/dma-to-first-seek-govt-nod-for-initiating-process-for-creation-of-theatre-commands-structures-later20210714194715/

Thu, 15 July 2021

इंटीग्रेटेड थिएटर कमांड की प्रक्रिया शुरू करने के लिए सैन्य विभाग को पहले लेनी होगी मंजूरी, बाद में तैयार होगा ढांचा

सेना की योजनाओं के मुताबिक, थलसेना के अधिकारी ईस्टर्न और वेस्टर्न थिएटर कमांड की जिम्मेदारी संभालेंगे। वहीं मैरिटाइम थिएटर कमांड का नेतृत्व नौसेना और एयर डिफेंस कमांड का नेतृत्व भारतीय वायुसेना के अधिकारी करेंगे।

Edited By: साकेत आनंद

देश में नए इंटीग्रेटेड थिएटर कमांड बनाने के लिए जारी प्रक्रिया के बीच रक्षा मंत्रालय इसके लिए पहले सरकार से मंजूरी लेगा। एकीकृत थिएटर कमांड बनाने का नेतृत्व चीफ ऑफ डिफेंस स्टाफ (सीडीएस) जनरल बिपिन रावत के तहत आने वाला सैन्य विभाग (DMA) कर रहा है। मौजूदा प्लान के मुताबिक, डीएमए की योजना एयर डिफेंस कमांड के साथ 4 थिएटर कमांड स्थापित करने की है।

चीफ ऑफ डिफेंस स्टाफ जनरल बिपिन रावत (फाइल फोटो)

सरकार के सूत्रों ने समाचार एजेंसी एएनआई से कहा, "इन कमांड्स को बनाने की प्रक्रिया के लिए सबसे सरकार की मंजूरी लेनी होगी। एकबार यह प्रक्रिया पूरी होने के बाद, तीनों सेनाओं के संबंधित अधिकारियों को आगे की बातचीत और थिएटर कमांड का ढांचा बनाने के लिए कहा जाएगा।"

ये थिएटर कमांड देश की तीनों सैन्य सेवाओं के अलग-अलग जगह पर पहले से मौजूद 17 कमांड के अतिरिक्त होंगे। थलसेना के पास तीन थिएटर कमांड, जबकि नौसेना के पास एक कमांड की जिम्मेदारी होगी। वहीं भारतीय वायुसेना को एयर डिफेंस कमांड की जिम्मेदारी दी जाएगी। इन एकीकृत थिएटर कमांड का लक्ष्य तीनों सेनाओं के बीच समन्वय को बढ़ाना और युद्ध जैसी स्थितियों में संसाधनों का कुशलता के साथ उपयोग करना है।

सरकार के सूत्रों ने बताया कि थिएटर कमांड के लिए ढांचा बनाने की कोई जल्दबाजी नहीं है और नई संरचनाओं को बनाने के लिए सरकार की मंजूरी पाने की कोशिश की जाएगी। तीनों सेनाओं के सीनियर अधिकारियों को इसका चार्ज दिया जाएगा और वे इस पद पर रिटायर होने तक रहेंगे।

थिएटर कमांड्स को लेकर देखने को मिली मतभेद

सेना की योजनाओं के मुताबिक, थलसेना के अधिकारी ईस्टर्न और वेस्टर्न थिएटर कमांड की जिम्मेदारी संभालेंगे। वहीं मैरिटाइम थिएटर कमांड का नेतृत्व नौसेना और एयर डिफेंस कमांड का नेतृत्व भारतीय वायुसेना के अधिकारी करेंगे। इन थिएटर कमांड्स को बनाने की दिशा में पहला कदम 1 जनवरी 2020 से चीफ ऑफ डिफेंस स्टाफ के रूप में देखा गया था। हालांकि तीनों सेनाओं के बीच अब भी एकीकृत थिएटर कमांड बनाने को लेकर बातचीत जारी है। थिएटर कमांड के गठन को लेकर पिछले दिनों मतभेद भी देखने को मिली थी। वायुसेना प्रमुख एयर चीफ मार्शल आरकेएस भदौरिया कहा था कि भारतीय वायुसेना एकीकृत थिएटर कमांड के गठन को लेकर पूरी तरह प्रतिबद्ध है, लेकिन इस प्रक्रिया को "सही तरीके से पूरा किया जाना चाहिए"।

https://www.tv9hindi.com/india/dma-to-first-seek-govt-nod-for-initiating-process-for-creation-of-integrated-theatre-commands-structures-later-736378.html

THE HINDU

Thu, 15 July 2021

Operation Sankalp: Sixteen Indian-flagged vessels provided safe passage everyday

Operation Sankalp was started in June 2019 after there were explosions on board two oil tanker ships in the Gulf of Oman amid increased tensions between Iran and the U.S.

New Delhi: The Indian Navy's Operation Sankalp has provided safe passage to an average 16 Indian-flagged merchant vessels in the Gulf region everyday, an official statement said on July 14.

Operation Sankalp was started in June 2019 after there were explosions on board two oil tanker ships in the Gulf of Oman amid increased tensions between Iran and the U.S.

"Since then, an Indian Navy ship with an integral helicopter embarked has been continuously deployed in the north-west Arabian Sea [off R'as al Hadd], Gulf of Oman and Persian Gulf from June 2019, to show presence, instil confidence in Indian maritime community and provide assistance to Indian-flagged merchant vessels," the statement said.

Operation Sankalp: Ensuring safety of India's Mercantile Marine in the Persian Gulf and the Gulf of Oman. Photo: Twitter/@indiannavy

Twenty-three warships have been deployed till date for this operation and on an average 16 Indian-flagged merchant vessels are being provided safe passage each day in the Gulf region, the Indian Navy said. "During this operation, Indian Navy Armed Security Teams [IN-AST] are being embarked onboard Indian-flagged merchant vessels transiting the area, based on their request," it noted.

India is dependent for about 85% of its demand for oil on imports. In 2019-2020, around 62% of India's oil imports valued at approximately $66 billion came from the Gulf region, the Navy said.

"For the same year, India's exports and imports from the region stood at around $51 billion and $108.2 billion, respectively. These constitute 8.1% and 11.4% of India's total exports and imports, respectively," it noted.

Despite diversification of sources for import of oil, Gulf countries are likely to continue as major suppliers of oil for India, it said. "Due to the prevailing security situation in Persian Gulf, it is required to provide security to Indian-flagged merchant vessels transiting through the region by showing presence, escorting or providing close support to vessels as required," it said.

https://www.thehindu.com/news/national/operation-sankalp-sixteen-indian-flagged-vessels-provided-safe-passage-everyday/article35322499.ece

ZEENEWS

Thu, 15 July 2021

समंदर में Indian Navy का दबदबा बढ़ा; जानें 'Operation Sankalp' की कहानी

Two years of Operation Sankalp: इस दौरान करीब 16 भारतीय जहाज रोजाना इन्हीं रास्तों से होकर गुजरे। देश के व्यावसायिक हितों की रक्षा के लिए इस रूट को सुरक्षित रखना इसलिए भी जरूरी है क्योंकि देश अपनी जरूरत का 82% तेल (Crude Oil) बाहर से आयात करता है।

By Krishna Mohan Mishra

खास बातें

1. ***समंदर में बढ़ी भारत की ताकत***
2. ***'विश्व सैन्य हस्ताक्षर बना भारत'***
3. ***'ऑपरेशन संकल्प के 2 साल पूरे'***

नई दिल्ली: दुनिया के नक्शे में तेजी से एक बड़ी ताकत के रूप में उभरता भारत अब विश्व की सैन्य राजनीति का एक सशक्त हस्ताक्षर बन चुका है। इस संदर्भ में हालिया कामयाबी की बात करें तो लगातार दो साल तक भारतीय नौसेना (Indian Navy) ने अरब सागर (Arabian Sea) और ओमान की खाड़ी में लगातार अपनी मजबूत पकड़ बनाते हुए अपने व्यापारिक जहाजों की सुरक्षा के लिए 23 जंगी जहाज तैनात किए थे। इस दौरान किसी भी भारतीय जहाज (Indian Ship) पर जरा भी खरोंच तक नहीं आई। यानी उन पर किसी तरह का कोई हमला नहीं हुआ।

फाइल फोटो: (रॉयटर्स)

समुंदर में बढ़ी ताकत

साल 2019-2020 में भारत ने अपना 62% तेल इसी रास्ते से मंगाया जिसकी कीमत लगभग 5 लाख करोड़ रुपए थी। इसी दौरान भारत ने इसी रूट के जरिए 3.8 लाख करोड़ रुपए का निर्यात और 8 लाख करोड़ रुपए का आयात इसी रूट के जरिए किया।

'ऑपरेशन संकल्प'

इन आंकड़ों से इतर बात करें तो विदेशों में रहने वाले भारतीयों की कुल संख्या का एक बड़ा हिस्सा यानी करीब 85 लाख लोग अपने कारोबार के लिए खाड़ी देशों में रहते हैं। यानि भारत की अर्थव्यवस्था का एक बड़ा हिस्सा सिर्फ इस रास्ते के जरिए होने वाले बिजनेस पर निर्भर है। इसके लिए इस रूट पर बिना किसी रुकावट के आवागमन जरूरी है।

आपको बताते चलें कि 13 जून 2019 को इरान और अमेरिका के बीच तनाव के दौरान तेल के दो टैंकरों में धमाके के बाद आग लग गई थी ये घटनाक्रम ओमान की खाड़ी में सामने आया था। उस घटना ने भारत को अपने जहाजों की सुरक्षा के लिए चिंतित किया जिसके बाद भारतीय नौसेना ने ऑपरेशन संकल्प की शुरुआत की जो कामयाब रहा।

'चंद मिनट में होगा दुश्मनों का काम तमाम'

ऑपरेशन में अरब सागर और खाड़ी के सभी महत्वपूर्ण स्थानों उत्तर-पश्चिमी अरब सागर, ओमान की खाड़ी और फारस की खाड़ी में नौसेना ने अपने बड़े जंगी बेड़े तैनात कर दिए। इन सभी जहाजों में हेलीकॉप्टर भी तैनात किए गए ताकि आपात स्थिति में फंसे भारतीय जहाजों तक कम समय में मदद पहुंचाई जा सके।

जंगी जहाजों में भारतीय नौसेना के प्रशिक्षित कमांडो तैनात हैं जो किसी भी भारतीय जहाज की अपील पर तुरंत उस जहाज पर चढ़ने के लिए साजोसामान से लैस रहते हैं। इस लंबी अवधि के दौरान किसी भारतीय जहाज के साथ कोई दुर्घटना नहीं हुई जो एक बड़ी उपलब्धि से कम नहीं है।

https://zeenews.india.com/hindi/india/indian-navy-successfully-conducted-operation-sankalp-for-safety-of-indian-ships-and-naval-route-in-arabian-sea/942089

THE NEW INDIAN EXPRESS

Thu, 15 July 2021

Jaishankar holds talks with Chinese counterpart Wang Yi as India keeps a close eye on PLA activities at LAC

The two ministers agreed that the next round of military dialogue should be convened at the earliest and its focus should be on discussing all the remaining issues to find a acceptable solution

New Delhi: External Affairs Minister S Jaishankar on Wednesday firmly conveyed to his Chinese counterpart Wang Yi that the prolongation of the existing situation in eastern Ladakh was visibly impacting the bilateral ties in a "negative manner" and rued that there was no forward movement from the Chinese side since the disengagement in Pangong lake areas in February that had created conditions for resolving the remaining issues.

During a one-hour meeting on the sidelines of an SCO conclave in Dushanbe, the external affairs minister also told Wang that any unilateral change in the status quo along the Line of Actual Control (LAC) was "not acceptable" to India and that the overall ties can only develop after full restoration of peace and tranquillity in eastern Ladakh.

An Indian army convoy moves on the Srinagar- Ladakh highway at Gagangeer, northeast of Srinagar, Wednesday, Sept. 9, 2020. (Photo | AP)

The two foreign ministers agreed to hold the next round of military dialogue at the earliest and that it should discuss all the remaining issues and seek a mutually acceptable solution, according to the Ministry of External Affairs (MEA).

The in-person meeting took place in the midst of a stalemate in the disengagement process between the two militaries in remaining friction points in eastern Ladakh after they withdrew troops and weapons from the Pangong lake areas in February following series of military and diplomatic talks to resolve the standoff.

"The External Affairs Minister (EAM) recalled that both sides had agreed that a prolongation of the existing situation was not in the interest of either side. It was visibly impacting the relationship in a negative manner," the MEA said in a statement.

Assessing the overall relationship, Jaishankar emphasised that maintenance of peace and tranquillity in the border areas has been the foundation for the development of ties since 1988.

"The attempts to change status quo last year that also disregarded commitments under the 1993 and 1996 agreements have inevitably affected ties."

"He emphasized that it was, therefore, in mutual interest that the two sides work towards early resolution of the remaining issues along the LAC in Eastern Ladakh, while fully abiding by bilateral agreements and protocols," the MEA said.

It was the first meeting between Jaishankar and Wang after their talks in Moscow on the sidelines of another SCO conclave in September last year.

In the Moscow talks, both sides reached a five-point agreement to resolve the border row.

The pact included measures like quick disengagement of troops, avoiding action that could escalate tensions, adherence to all agreements and protocols on border management and steps to restore peace along the LAC.

"Recalling their last meeting in Moscow, in September 2020, the External Affairs Minister emphasized the need to follow through on the agreement reached then and complete the disengagement, resolving the remaining issues along the LAC in Eastern Ladakh at the earliest," the MEA said.

It said Jaishankar pointed out to Wang that the successful disengagement in the Pangong Lake Area earlier this year had created conditions for resolving the remaining issues.

"It was expected that the Chinese side would work with us towards this objective. The External Affairs Minister noted, however, that the situation in remaining areas is still unresolved," the MEA said.

It said the ministers agreed that the next round of military talks should be convened at the earliest.

"They also agreed that in this meeting, the two sides should discuss all the remaining issues and seek a mutually acceptable solution. There was also an understanding that both sides will continue to ensure stability on the ground and neither side will take any unilateral action that could increase tension," the MEA said.

In a series of tweets, Jaishankar said the discussions focused on the outstanding issues along the LAC in eastern Ladakh.

The MEA said that the two ministers had a detailed exchange of views on the current situation along the LAC in eastern Ladakh and also on other issues related to the overall India-China relations.

"Concluded a one-hour bilateral meeting with State Councilor and FM Wang Yi of China on the sidelines of Dushanbe SCO Foreign Ministers Meeting.

Discussions focused on the outstanding issues along the LAC in the Western Sector," Jaishankar tweeted.

He said full restoration and maintenance of peace and tranquillity in border areas was essential for the development of the bilateral ties.

"Highlighted that unilateral change of status quo is not acceptable. Full restoration and maintenance of peace and tranquillity in border areas is essential for development of our ties," Jaishankar said.

The MEA said the two Ministers had a detailed exchange of views on the current situation along the LAC in Eastern Ladakh and also on other issues related to the overall India-China relations.

In the meeting, Jaishankar and Wang noted the agreement between both sides in the last round of talks at the Working Mechanism for Consultation and Coordination on India-China Border Affairs (WMCC) on June 25 to hold another round of military talks.

The MEA said the two ministers also agreed to remain in touch.

India and China have been locked in a military standoff at multiple friction points in eastern Ladakh since early May last year.

The two sides completed the withdrawal of troops and weapons from the North and South banks of Pangong lake in February following a series of military and diplomatic talks.

The two sides are now engaged in talks to extend the disengagement process to the remaining friction points.

There was no visible forward movement in disengagement of troops in the remaining friction points as the Chinese side did not show flexibility in their approach on it at the 11th round of military talks.

According to military officials, each side currently has around 50,000 to 60,000 troops along the Line of Actual Control in the sensitive sector.

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There has been no attempt by the Indian or the Chinese side to occupy the areas in eastern Ladakh from where they disengaged in February and both sides are involved in talks to resolve the remaining issues in the region, the Indian Army said on Wednesday.

The Army said it has been monitoring activities by the Chinese People's Liberation Army (PLA) including turnover of troops in the region.

The Army stated this in a statement trashing a media report which claimed the Chinese military has again crossed the Line of Actual Control (LAC) in eastern Ladakh at several places and that there has been at least one incident of clash between the two sides.

"Ever since the disengagement agreement in February this year, there has been no attempt by either side to occupy the areas from where the disengagement had been undertaken. There have been no clashes in Galwan or any other area, as reported in the article," the Army said.

It also said that the report mentioning that agreements with China have collapsed is "false and baseless".

"Both sides have continued with negotiations to resolve the balance issues, and regular patrolling in respective areas continues. The situation on the ground continues to be as hithertofore. PLA activities, including turnover of troops, continue to be monitored by the Indian Army," the Army said.

To a query about the Indian media report, Chinese Foreign Ministry spokesman Zhao Lijian said in Beijing that he was not aware of it.

"I am not aware of the situation you mentioned," Zhao said.

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https://www.newindianexpress.com/nation/2021/jul/14/jaishankar-holds-talks-with-chinese-counterpart-wang-yi-as-india-keeps-a-close-eye-on-pla-activities-2330153.html

Hindustan Times

Thu, 15 July 2021

ISRO successfully tests engine for its manned Gaganyaan mission

The space agency test-fired the Vikas engine used in the second stage of the rocket for 240 seconds, the full duration it will operate during an actual mission

By Anonna Dutt

New Delhi: In a major milestone, the Indian Space Research Organisation (Isro) completed the final testing of one of the three stages of the launch vehicle that will carry humans to space under the Gaganyaan mission.

ISRO successfully conducted the hot test of the liquid propellant Vikas Engine for the core L110 liquid stage of the human-rated GSLV MkIII vehicle, as part of engine qualification requirements for the Gaganyaan programme. (ANI Photo)

The space agency test-fired the Vikas engine used in the second stage of the rocket for 240 seconds, the full duration it will operate during an actual mission, at the engine test facility Isro Propulsion Complex (IPRC)-Mahendragiri in Tamil Nadu.

"The performance of the engine met the test objectives and the engine parameters were closely matching with the predictions during the entire duration of the test," the space agency said in a release.

Isro's GSLV Mk III, which successfully carried the Chandrayaan-2 mission to space in its first operational flight, has three stages – the two solid S200 boosters fired at the launch, the core L110 liquid stage, and the upper C-25 cryogenic stage.

"The liquid stage of the launch vehicle uses two Vikas engines, which is what was tested by Isro today. The engine was fired for the full duration it will operate during the actual mission. It is a pretty big milestone, signalling that this particular engine is ready for launch," said an expert on propulsion systems, on condition of anonymity.

The expert added, "The first stage of the launch vehicle that uses solid propellant is already qualified. Now, Isro just needs to test the performance of the cryogenic stage before the launch vehicle is ready for the mission."

The launch of Chandrayaan-2 was delayed in 2019 after there was a helium leak in the cryogenic stage of the engine. The S-200 solid booster stage of the launch vehicle also underwent design changes for human rating, with Larsen & Toubro delivering the first sturdier casing last year.

https://www.hindustantimes.com/india-news/isro-successfully-tests-engine-for-its-manned-gaganyaan-mission-101626287580546.html

Thu, 15 July 2021

गगनयान का 'विकास' इंजन तीसरे परीक्षण में भी सफल, टेस्ला के CEO एलन मस्क ने ISRO को दी बधाई

इसरो ने बुधवार को अपने गगनयान कार्यक्रम के लिए तरल प्रणोदक इंजन विकास का तीसरा लंबी अवधि का सफल उष्ण परीक्षण किया। वहीं, अमेरिका की वाहन निर्माता कंपनी टेस्ला के सीईओ एलन मस्क ने इसरो को बधाई दी है।

बेंगलुरू: भारतीय अंतरिक्ष अनुसंधान संगठन (इसरो) ने बुधवार को अपने गगनयान कार्यक्रम के लिए तरल प्रणोदक इंजन विकास का तीसरा लंबी अवधि का सफल उष्ण परीक्षण किया। इसरो ने ट्विटर पर इसको लेकर जानकारी साझा की। बता दें, इसरो के इस ट्वीट पर अमेरिका की वाहन निर्माता कंपनी टेस्ला के सीईओ एलन मस्क ने बधाई दी है।

एलन मस्क ने इसरो के ट्वीट पर रिएक्ट देते हुए लिखा, बधाई और इसके आगे उन्होंने भारत के झंडे का इमोजी लगाया। बता दें, गगनयान अंतरिक्ष भेजे जाने वाला देश का पहला मानवयुक्त मिशन है। इसरो ने एक बयान में कहा कि यह परीक्षण गगनयान कार्यक्रम के लिए इंजन योग्यता जरूरत के तहत जीएसएलवी एमके 3 यान के एल 110 तरल चरण के लिए किया गया। इसमें कहा गया है कि इसरो प्रोपल्शन कॉम्प्लेक्स (आईपीआरसी), महेंद्रगिरि, तमिलनाडु के परीक्षण केंद्र में इंजन को 240 सेकंड के लिए प्रक्षेपित किया गया।

पहला मानव रहित मिशन दिसंबर 2021 में भेजने की प्रक्षेपित किया जाएगा- केंद्रीय अंतरिक्ष मंत्री जितेंद्र सिंह

बयान के अनुसार इस दौरान इंजन ने परीक्षण के उद्देश्यों को पूरा किया और परीक्षण की पूरी अवधि के दौरान इंजन मानक अनुमानों के अनुरूप थे। गगनयान कार्यक्रम का मकसद किसी भारतीय प्रक्षेपण यान से मानव को पृथ्वी की निचली कक्षा में भेजने और उन्हें वापस धरती पर लाने की क्षमता प्रदर्शित करना है।

केंद्रीय अंतरिक्ष मंत्री जितेंद्र सिंह ने इस साल फरवरी में कहा था कि पहला मानव रहित मिशन दिसंबर 2021 में और दूसरा मानव रहित मिशन 2022-23 में और उसके बाद मानव सहित अंतरिक्ष यान की योजना है।

https://www.abplive.com/news/india/gaganyaan-vikas-engine-also-successful-in-third-test-telsa-ceo-elon-musk-congratulates-1940509

PHYS.ORG

Thu, 15 July 2021

Approaching the Heisenberg limit

A football is not a quantum particle. There are crucial differences between the things we know from everyday life and tiny quantum objects. Quantum phenomena are usually very fragile. To study them, one normally uses only a small number of particles, well shielded from the environment, at the lowest possible temperatures.

Infrared image of the particle trapped in front of the microscope objective while in the quantum ground state. Credit: Lorenzo Magrini/Constanze Bach/Aspelmeyer Group/University of Vienna

Through a collaboration between the University of Vienna, the Austrian Academy of Sciences and TU Wien, however, it has now been possible to measure a hot glass sphere consisting of about one billion atoms with unprecedented precision and to control it at the quantum level. Its movement was deliberately slowed down until it assumed the ground state of lowest possible energy. The measurement method almost reached the limit set by Heisenberg's uncertainty principle—physics just does not allow for any more precision than that. This was made possible by applying special methods from control engineering to quantum systems. The results have now been published in the scientific journal *Nature*.

Perfect precision is impossible

The measurement influences the measured object—this is one of the most basic principles of quantum theory. "Werner Heisenberg came up with a famous thought experiment—the so-called Heisenberg microscope" explains physicist Lorenzo Magrini, the first author of the study from the University of Vienna. "If you want to measure the position of an object very precisely under a microscope, you have to use light with the shortest possible wavelength. But short wavelength means higher energy, so the movement of the particle is disturbed more strongly." You just cannot accurately measure the location and the state of motion of a particle at the same time. The product of their uncertainties is always limited by Planck's constant—this is the so-called Heisenberg uncertainty principle. However, it is possible to find out how close one can get to this limit set by nature.

Prof. Markus Aspelmeyer's team at the University of Vienna is investigating this using a glass sphere with a diameter of less than 200 nanometres, consisting of about one billion particles—very small by our everyday standards, but still very large compared to objects usually studied in quantum physics.

The glass sphere can be kept in place with a laser beam. The atoms of the sphere are heated up by the laser, and the internal temperature of the sphere rises to several hundred degrees Celsius. This means that the atoms of the glass sphere are wobbling around violently. In the experiment, however, it was not the wobbling movements of the individual atoms that were studied, but the collective motion of the sphere in the laser trap. "These are two completely different things, just as the movement of a pendulum in a pendulum clock is something different from the movement of the individual atoms inside the pendulum," says Markus Aspelmeyer.

Quantum control technology

The goal was to precisely control the pendulum motion of the glass sphere on a quantum level, even though the glass sphere is actually a macroscopic object. This can only be achieved using a perfectly designed control system, carefully adjusted to the experiment. This task was taken on by the team of Prof. Andreas Kugi at TU Wien.

"Control engineering is about influencing systems in such a way that they exhibit a desired behavior independent of disturbances and parameter fluctuations," says Andreas Kugi. "This can be

a robot arm, for example, a production line in a factory, or even the temperature of a blast furnace." Applying modern methods of control engineering to quantum systems opens up new possibilities. "However, one also has to face challenges that do not exist in classical system theory and control engineering," explains Kugi. "In classical control engineering, the measurement has no or negligible influence on the system. In quantum physics, however, this influence cannot be avoided, for very fundamental reasons. We therefore also have to develop novel control engineering methods."

This was a success: the light backscattered by the glass sphere was detected as thoroughly as possible, using a sophisticated microscopy technique. By analyzing the scattered light, the position of the sphere was determined in real time, and then an electric field was continuously adjusted in such a way that it permanently counteracted the movement of the glass sphere. In this way, it was possible to slow down the entire sphere and put it into a state of motion that corresponds to the quantum-physical ground state, i.e. the state of the smallest possible kinetic energy—despite the fact that it is a relatively large object at high temperatures, whose atoms wobble vigorously.

Promising cooperation between physics and control engineering

"You always have to consider spatial and kinetic uncertainty together. Overall, the quantum uncertainty of the glass sphere was only 1.7 times Planck's quantum of action," says Lorenzo Magrini. Planck's constant would be the absolute theoretical lower limit, never before has an experiment come that close to the absolute quantum limit using an object of this size. The kinetic energy measured in the experiment corresponded to a temperature of just 5 micro-Kelvin, i.e. 5 millionths of a degree above absolute zero. The movement of the glass sphere as a whole can therefore be assigned an extremely low temperature even if the atoms that make up the sphere are very hot.

This success shows the great potential of this new combination of quantum physics and control engineering: both research groups want to continue working in this direction and exploit know-how from control engineering to enable even better and more precisely controlled quantum experiments. There are many possible applications for this, ranging from quantum sensors to technologies from the field of quantum information.

More information: Lorenzo Magrini et al, Real-time optimal quantum control of mechanical motion at room temperature, *Nature* (2021). DOI: 10.1038/s41586-021-03602-3

Journal information: *Nature*

https://phys.org/news/2021-07-approaching-heisenberg-limit.html

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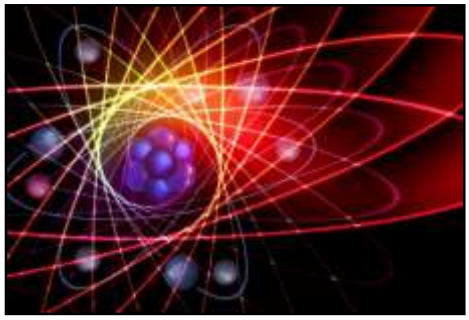
Thu, 15 July 2021

New evidence of an anomalous phase of matter brings energy-efficient technologies closer

By Vanessa Bismuth

Researchers have found evidence for an anomalous phase of matter that was predicted to exist in the 1960s. Harnessing its properties could pave the way to new technologies able to share information without energy losses. These results are reported in the journal *Science Advances*.



Credit: Pixabay/CC0 Public Domain

While investigating a quantum material, the researchers from the University of Cambridge who led the study observed the presence of unexpectedly fast waves of energy rippling through the material when they exposed it to short and intense laser pulses. They were able to make these observations by using a microscopic speed camera that can track small and very fast movement on a scale that is challenging with many other techniques. This technique probes the material with two light pulses: the first one disturbs it and creates waves—or oscillations—propagating outward in concentric circles, in the same way as dropping a rock into a pond; the second light pulse takes a snapshot of these waves at various times. Put together, these images allowed them to look at how these waves behave, and to understand their 'speed limit.'

"At room temperature, these waves move at a hundredth of the speed of light, much faster than we would expect in a normal material. But when we go to higher temperatures, it is as if the pond has frozen," explained first author Hope Bretscher, who carried out this research at Cambridge's Cavendish Laboratory. "We don't see these waves moving away from the rock at all. We spent a long time searching for why such bizarre behavior could occur."

The only explanation that seemed to fit all the experimental observations was that the material hosts, at room temperature, an 'excitonic insulator' phase of matter, which while theoretically predicted, had eluded detection for decades.

"In an excitonic insulator, the observed waves of energy are supported by charge neutral particles that can move at electron-like velocities. Importantly, these particles could transport information without being hindered by the dissipation mechanisms that, in most common materials, affect charged particles like electrons," said Dr. Akshay Rao from the Cavendish Laboratory, who led the research. "This property could provide a simpler route toward room-temperature, energy-saving computation than that of superconductivity."

The Cambridge team then worked with theorists around the world to develop a model about how this excitonic insulating phase exists, and why these waves behave in this way.

"Theorists predicted the existence of this anomalous phase decades ago, but the experimental challenges to see evidence of this has meant that only now we are able to apply previously developed frameworks to provide a better picture of how it behaves in a real material," commented Yuta Murakami, from the Tokyo Institute of Technology, who collaborated on the study.

"The dissipationless energy transfer challenges our current understanding of transport in quantum materials and opens theorists' imaginations to new ways for their future manipulation," said collaborator Denis Gole, from the Jozef Stefan Institute and University of Ljubljana.

"This work puts us a step closer toward achieving some incredibly energy-efficient applications that can harness this property, including in computers," concluded Dr. Rao.

More information: Hope M. Bretscher et al, Imaging the coherent propagation of collective modes in the excitonic insulator Ta2NiSe5 at room temperature, *Science Advances* (2021). DOI: 10.1126/sciadv.abd6147

Journal information: *Science Advances*

https://phys.org/news/2021-07-evidence-anomalous-phase-energy-efficient-technologies.html

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Thu, 15 July 2021

New mechanism of superconductivity discovered in graphene

Superconductivity is a physical phenomenon where the electrical resistance of a material drops to zero under a certain critical temperature. Bardeen-Cooper-Schrieffer (BCS) theory is a well-established explanation that describes superconductivity in most materials. It states that Cooper pairs of electrons are formed in the lattice under sufficiently low temperature and that BCS superconductivity arises from their condensation. While graphene itself is an excellent conductor of electricity, it does not exhibit BCS superconductivity due to the suppression of electron-phonon interactions. This is also the reason that most 'good' conductors such as gold and copper are 'bad' superconductors.

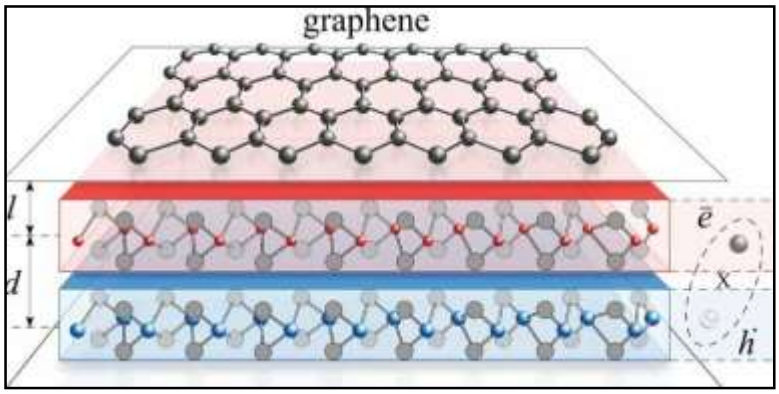

Figure 1. A hybrid system consisting of an electron gas in graphene (top layer) separated from a two-dimensional Bose-Einstein condensate, represented by indirect excitons (blue and red layers). The electrons in the graphene and the excitons are coupled by the Coulomb force. Credit: Institute for Basic Science

Researchers at the Center for Theoretical Physics of Complex Systems (PCS), within the Institute for Basic Science (IBS, South Korea) have reported on a novel alternative mechanism to achieve superconductivity in graphene. They achieved this feat by proposing a hybrid system consisting of graphene and 2D Bose-Einstein condensate (BEC). This research is published in the journal *2D Materials*.

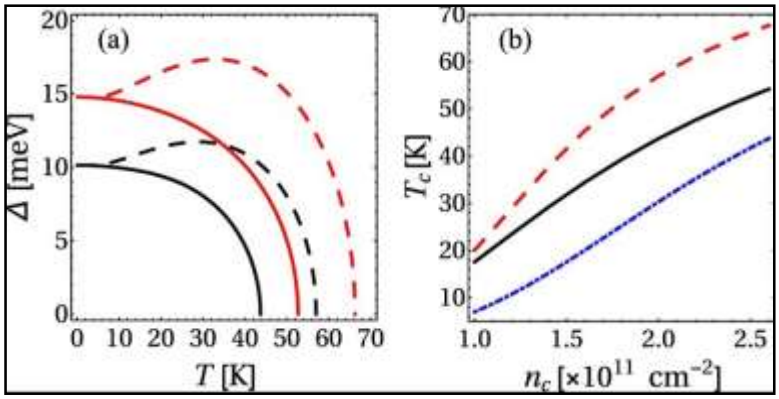

Figure 2. (a) Temperature dependence of the superconducting gap for bogolon-mediated process with temperature correction (dashed) and without temperature correction (solid). (b) The critical temperature of the superconductivity transition as a function of condensate density for bogolon-mediated interaction with (red dashed) and without (black solid) the temperature correction. The blue dash-dotted line shows the BKT transition temperature as a function of the condensate density. Credit: Institute for Basic Science

Along with superconductivity, BEC is another phenomenon that arises at low temperatures. It is the fifth state of matter first predicted by Einstein in 1924. The formation of BEC occurs when low-energy atoms clump together and enter the same energy state, and it is an area that is widely studied in condensed matter physics. A hybrid Bose-Fermi system essentially represents a layer of electrons interacting with a layer of bosons, such as indirect

excitons, exciton-polaritons, etc. The interaction between Bose and Fermi particles leads to various novel fascinating phenomena, which piques interests from both the fundamental and application-oriented perspectives.

In this work, the researchers report a new mechanism of superconductivity in graphene, which arises due to interactions between electrons and "bogolons," rather than phonons as in typical BCS systems. Bogolons, or Bogoliubov quasiparticles, are excitation within BEC which has some characteristics of a particle. In certain ranges of parameters, this mechanism permits the critical temperature for superconductivity up to 70 Kelvin within graphene. The researchers also developed a new microscopic BCS theory which focuses specifically on the novel hybrid graphene-based system. Their proposed model also predicts that superconducting properties can be enhanced with temperature, resulting in the non-monotonous temperature dependence of the superconducting gap.

Furthermore, the research showed that the Dirac dispersion of graphene is preserved in this bogolon-mediated scheme. This indicates that this superconducting mechanism involves electrons with relativistic dispersion—a phenomenon that is not so well-explored in condensed matter physics.

"This work sheds light on an alternative way to achieve high-temperature superconductivity. Meanwhile, by controlling the properties of a condensate, we can tune the superconductivity of graphene. This suggests another channel to control the superconductor devices in the future," explains Ivan Savenko, the leader of the Light-Matter Interaction in Nanostructures (LUMIN) team at the PCS IBS.

More information: Meng Sun et al, Bose–Einstein condensate-mediated superconductivity in graphene, *2D Materials* (2021). DOI: 10.1088/2053-1583/ac0b49

https://phys.org/news/2021-07-mechanism-superconductivity-graphene.html

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Cells damaged by lung infection can become 'Covid-19 Factories', lead to severe complications

In a recent study, researchers revealed that the airway cells of patients with chronic lung diseases are "primed" for infection by the Covid-19 virus

By Satata Karmakar

As India fights novel coronavirus in the ferocious second wave, experts have warned that the infection is here to stay and that people should not let their guards down. There are several health complications that can give rise to severe coronavirus complications in a patient. In a recent study, researchers revealed that the airway cells of patients with chronic lung diseases are "primed" for infection by the Covid-19 virus, resulting in more severe symptoms, poorer outcomes, and a greater likelihood of death.

Cells Damaged by Chronic Lung Disease Can Result In Severe COVID

The study, published in Nature Communications, found that chronic lung disease causes genetic changes in the molecular makeup of a variety of cells, including the epithelial cells that line the lung and airways. The changes enable SARS-CoV-2, the virus that causes Covid-19, to enter the body, replicate and trigger an out-of-control immune response that fills the lungs with fluids and often results in patients needing respirators and lengthy hospitalisations. "Our results suggest that patients with chronic lung disease are molecularly primed to be more susceptible to infection by SARS-CoV-2," said Nicholas Banovich, Associate Professor at Translational Genomics Research Institute, a non-profit genomics research institute in Arizona, US.

COVID-19 Risk Factors

In addition, older-age, male-gender, smoking, and comorbidities such as high blood pressure, obesity, and diabetes, are all Covid-19 risk factors that are exacerbated by chronic lung diseases, such as Chronic Obstructive Pulmonary Disease, Interstitial Lung Disease, and especially Idiopathic Pulmonary Fibrosis, progressive scarring and stiffening of the lung tissue.

For the study, the team used single-cell RNA sequencing technology to spell out the genetic code of 611,398 cells from various databases, representing those with both healthy (control) lungs and those with chronic lung disease. Sequencing and analysis allowed researchers to identify molecular characteristics that may account for worse Covid-19 outcomes. Researchers specifically searched for changes in AT2 cells -- a major lung epithelial cell type, focusing on cellular pathways and expression levels of genes associated with Covid-19. They established a "viral entry score," a composite of all genes associated with SARS-CoV-2, and found higher scores among cells from patients with chronic lung disease.

Further, exploring changes in immune cells, they discovered dysregulated gene expression associated with hyper-inflammation and with sustained cytokine production -- two signature symptoms of severe SARS-CoV-2 infection. So-called cytokine storms in Covid-19 patients unleash a cascade of immune cells that flood the lungs, causing severe organ damage, the team explained.

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