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नवभारतGOLD
नवभारत टाइम्स की पहल

Wed, 13 Oct 2021

अग्नि-5 में क्या है, जो उड़ गई है चीन की नींद

अग्नि-5 मिसाइल के यूजर टेस्ट की तैयारियों की खबर को लेकर चीन इतना बेचैन हो गया कि उसने भारत पर एशिया की शांति भंग करने का इल्जाम लगा दिया। आखिर चीन इस मिसाइल से क्यों डरा हुआ है

By इंद्रनील शुक्ला

जैसे ही भारतीय सेना को अग्नि-5 मिसाइल मिलेगी, भारत दुनिया के उन पांच सुपरपावर देशों की बराबरी में खड़ा हो जाएगा, जो इंटर-कॉन्टिनेंटल बैलेस्टिक मिसाइल यानी आईसीबीएम क्षमता से लैस हैं। अग्नि-5, पांच हजार आठ सौ किलोमीटर या उससे ज्यादा दूरी तक मार कर सकेगी। पड़ोसी चीन के लगभग सारे शहर अब भारतीय मिसाइल की जद में होंगे। ऐसे में चीन के माथे पर चिंता की लकीरें ना हों, यह हो ही नहीं सकता।

अग्नि-5 मिसाइल के 'यूजर टेस्ट' की तैयारी की खबरों से दुनिया के सुपरपावर्स के बीच हलचल मच गई है। चीन तो जैसे बौखला ही उठा है। परमाणु हथियार ले जाने में सक्षम इस मिसाइल के यूजर टेस्ट को लेकर चीन ने जो बयान दिया है, उससे इसका पता चलता है। उसने आरोप लगाया कि भारत एशिया में शांति का माहौल नष्ट करना चाहता है। इस तरह के बेबुनियाद आरोपों को दरकिनार करते हुए भारत जल्द ही अग्नि-5 के यूजर टेस्ट की तैयारी में है।

चीन इस मुद्दे पर अपनी शिकायत लेकर संयुक्त राष्ट्र सुरक्षा परिषद के पास भी पहुंच गया है। चीन के विदेश मंत्रालय के प्रवक्ता झाओ लिजियान ने कहा, जून 1998 में निरस्त्रीकरण पर जो प्रस्ताव लिया गया था, यह उसे अंगूठा दिखाने जैसा है। उसका कहना है कि भारत अग्नि मिसाइल की रेंज लगातार बढ़ा रहा है। अगर इस मिसाइल की लगातार हो रही टेस्टिंग पर रोक नहीं लगाई गई, तो पड़ोसी देशों के बीच हथियारों की होड़ तेज होगी और क्षेत्र में शांति बनाए रखना मुश्किल होगा।

दिलचस्प बात यह है कि ये बातें चीन कर रहा है, जो खुद नई-नई मिसाइलों के विकास पर लगातार काम कर रहा है। यहां तक कि भारत को दबाव में लेने के लिए अपनी मिसाइलों की सप्लाई पाकिस्तान को भी कर रहा है। अग्नि-5 पर उसकी बौखलाहट की वजह क्या है, इसे समझने के लिए आपको एक नजर डालनी होगी इसकी खूबियों पर।

रक्षा क्षेत्र से जुड़े सूत्रों के मुताबिक, अग्नि-5 भारत की इकलौती मिसाइल होगी, जिसे इंटरकॉन्टिनेंटल बैलेस्टिक मिसाइल या आईसीबीएम की कैटिगरी में रखा जा सकता है। जैसा कि नाम से ही जाहिर है, इन मिसाइलों की रेंज इतनी होनी चाहिए कि वे एक महाद्वीप को पार कर दूसरे महाद्वीप तक पहुंच सकें। 5000 किलोमीटर से ज्यादा रेंज के साथ अग्नि-5 आईसीबीएम का दर्जा पाने की हकदार है। 50 टन वजन

वाली यह मिसाइल 1500 किलोग्राम तक के परमाणु हथियार अपने साथ ले जा सकती है और दुश्मन के किसी भी शहर को नेस्तनाबूद कर सकती है।

चीन का यह भी दावा है कि भारत अग्नि-5 की असल रेंज को छिपा रहा है। उसके मुताबिक, इस मिसाइल की रेंज 5800 किलोमीटर नहीं, बल्कि आठ हजार किलोमीटर है। अंतरराष्ट्रीय स्तर पर ज्यादा प्रतिक्रिया ना हो, इसके लिए भारत मिसाइल की रेंज कम करके बता रहा है। भारतीय रक्षा विशेषज्ञों के मुताबिक, चीन को ना तो हथियारों की होड़ की चिंता है और ना ही उसे संयुक्त राष्ट्र के किसी प्रस्ताव की मर्यादा की परवाह है। उसकी चिंता दो बिंदुओं पर है। एक तो इस मिसाइल की रेंज में लगभग पूरा चीन आ जाएगा। दूसरा, सुपरपावर्स के क्लब में शामिल होने का भारत का दावा और मजबूत हो जाएगा। पांच देशों के इस क्लब में अभी केवल अमेरिका, रूस, ब्रिटेन, फ्रांस और चीन शामिल हैं और ये सभी आईसीबीएम से लैस हैं। एशिया से कोई और देश खासकर भारत को सुरक्षा परिषद की स्थायी सदस्यता मिले, चीन ऐसा कतई नहीं चाहेगा। इसीलिए, चीन भारत की इस मिसाइल का यूजर टेस्ट रुकवाने के लिए हर दांव अपना रहा है। भारत को अंतरराष्ट्रीय मंचों पर घेरने की कोशिश कर रहा है।

अग्नि-5 का पहला टेस्ट अप्रैल 2012 में हुआ। सितंबर 2013 में दूसरा, जनवरी 2015 में तीसरा और दिसंबर 2016 में चौथा प्रक्षेपण किया गया। दिसंबर 2018 तक इसके सात टेस्ट किए गए। इन परीक्षणों के दौरान मिसाइल को अलग-अलग तरह के लॉन्चिंग पैड से दागा गया। उसे अलग-अलग ट्रैजेक्टरी पर प्रक्षेपित कर परखा गया। सभी तरह के टेस्ट में अग्नि-5 खरी उतरी। इसे चलते ट्रक तक से दागा जा सकता है।

'एक्सपेरिमेंटल टेस्ट' तो पूरे हो गए हैं, लेकिन इस मिसाइल का 'यूजर टेस्ट' अभी बाकी है। यानी मिसाइल को जिसे इस्तेमाल करना है, उसने ट्रायल नहीं किया है। अब यूजर टेस्ट की तैयारी की जा रही है। सेना यह मिसाइल चला कर देखेगी और इसे विकसित करनेवाली संस्था डीआरडीओ को बताएगी कि उसके मानदंडों पर यह कितनी खरी है। फिर जरूरी बदलावों के बाद अग्नि-5 भारतीय सेना के आयुध भंडार का हिस्सा बन जाएगी।

इसी यूजर टेस्ट से पहले चीन की बौखलाहट सामने आ रही है। वैसे, डीआरडीओ की तैयारी अग्नि-5 को और घातक बनाने की है। वह इसकी रेंज 10 हजार किलोमीटर तक ले जाने की कोशिशों में जुटा है। अभी इसे केवल जमीन से चलाया जा सकता है। पानी से भी यह मिसाइल चलाई जा सके, इसके लिए अग्नि-5 के सबमरीन वर्जन पर भी काम चल रहा है।

https://navbharattimes.indiatimes.com/navbharatgold/day-today/india-set-to-conduct-firts-user-trial-of-5000-kilometer-agni-v-missile-icbm-and-china-rattled-by-agni-v-testing/story/86893805.cms

THE FREE PRESS JOURNAL SINCE 1928

Wed, 13 Oct 2021

Dr. Sudhir Mishra conferred with prestigious Doctorate Degree

Dr. Sudhir Mishra, Distinguished Scientist & Director General (BrahMos), DRDO and CEO & MD, BrahMos Aerospace has been conferred the prestigious doctorate degree for his outstanding contribution to development and realisation of several Research and Development projects including design, development, modernising and upgrading of BRAHMOS missile system. Dr. Sudhir Mishra was awarded the honorary degree of 'Doctor of Science' by Shri Ramswaroop Memorial University at the varsity's first convocation ceremony on 11th October 2021, held at Lucknow-Deva Road (Barabanki, UP).

https://www.freepressjournal.in/corporate-gallery/dr-sudhir-mishra-conferred-with-prestigious-doctorate-degree

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Tue, 12 Oct 2021 11:13AM

Chief of Army Staff proceeds on a visit to Sri Lanka

General MM Naravane, the Chief of Army Staff (COAS) has proceeded on a visit to Sri Lanka from 12 to 16 October 2021. This is his first visit to Sri Lanka as COAS.

During the visit, he will be meeting the Country's senior military and civilian leadership where he will discuss avenues for enhancing India-Sri Lanka defence relations. The Army Chief will take forward the excellent defence cooperation between Sri Lanka and India through multiple meetings with senior officials of the security establishment and exchange views on various defence related issues. He will interact with the Service Chiefs, visit the Headquarters of the Sri Lankan Army, the Gajaba Regimental Headquarters and the Sri Lankan Military Academy.

The COAS will witness the culmination phase of the joint exercise between India and Sri Lanka, "Exercise Mitra Shakti", and later address the students and faculty at the Defence Services Command and Staff College at Batalanda.

The Army Chief is also scheduled to call on the Hon'ble President and Hon'ble Prime Minister of Sri Lanka.

https://pib.gov.in/PressReleasePage.aspx?PRID=1763149

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 12 Oct 2021 9:51AM

सेना प्रमुख श्रीलंका की यात्रा पर रवाना

थल सेनाध्यक्ष (सीओएएस) जनरल एम एम नरवणे दिनांक 12 से 16 अक्टूबर 2021 तक श्रीलंका के दौरे पर गए हैं। सेना प्रमुख के रूप में यह उनकी श्रीलंका की पहली यात्रा है।

यात्रा के दौरान वह देश के वरिष्ठ सैन्य और नागरिक नेतृत्व से मुलाकात करेंगे, जहां वह भारत-श्रीलंका रक्षा संबंधों को आगे बढ़ाने के तरीकों पर चर्चा करेंगे। सेना प्रमुख सुरक्षा प्रतिष्ठान के वरिष्ठ अधिकारियों के साथ अनेक बैठकों के माध्यम से श्रीलंका और भारत के बीच उत्कृष्ट रक्षा सहयोग को आगे बढ़ाएंगे और रक्षा संबंधी विभिन्न मुद्दों पर विचारों का आदान-प्रदान करेंगे। वह सेना प्रमुखों के साथ बातचीत करेंगे, श्रीलंकाई सेना के मुख्यालय, गजबा रेजिमेंटल मुख्यालय और श्रीलंकाई सैन्य अकादमी का दौरा करेंगे।

सेना प्रमुख भारत और श्रीलंका के बीच संयुक्त अभ्यास "एक्सरसाइज मित्र शक्ति" के समापन चरण का गवाह बनेंगे और बाद में बटालांडा में डिफेंस सर्विसेज कमांड एंड स्टाफ कॉलेज में छात्रों और शिक्षकों को संबोधित करेंगे।

सेना प्रमुख का श्रीलंका के माननीय राष्ट्रपति और माननीय प्रधानमंत्री से भी मिलने का कार्यक्रम है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1763266

Press Information Bureau
Government of India

Ministry of Defence

Tue, 12 Oct 2021 9:51AM

Admiral Michael Gilday, Chief of Naval Operations United States Navy visit to India

Adm Michael Gilday, Chief of Naval Operations, US Navy is on a five day official visit to India, from 11-15 Oct 21. During the visit, Admiral Gilday will interact with Adm Karambir Singh, Chief of the Naval Staff, in addition to other high ranking *GoI* officials. Admiral Gilday is scheduled to visit Indian Navy's Western Naval Command (at Mumbai) and Eastern Naval Command (at Visakhapatnam) wherein he would interact with the respective Commander-in-Chiefs. Admiral Gilday is also scheduled to embark the USN Carrier Strike Group off the East Coast of India alongwith an Indian delegation.

India and USA have traditionally maintained close and friendly relations. The Defence relationship between the two countries has been one of mutual trust and confidence, which has transformed after the accord of major '*Defence Partner Status*' to India in Jun 16. In addition, both countries have concluded certain foundational agreements, which includes the Defence Framework Agreement, signed in 2015, which lays a blue print for collaboration between the defence establishments of both countries, the Logistics Exchange Memorandum of Agreement (LEMOA) signed in 2016, which is a foundational agreement facilitating reciprocal logistics support between the Armed Forces of both countries, the Communications Compatibility and Security Agreement (COMCASA) signed on 06 Sep 18, which facilitates information-sharing between the Armed Forces of both nations and more recently, the Basic Exchange Cooperation Agreement (BECA), which enables sharing of geo - spatial information between Ministry of Defence and National Geospatial Agency (NGA), USA.

The Indian Navy closely cooperates with the US Navy on numerous issues, which include operational interactions such as the MALABAR and RIMPAC series of exercises, training exchanges, exchange of White Shipping Information and Subject Matter Experts in various fields, all of which are coordinated through the medium of Executive Steering Group (ESG) meetings conducted annually. In addition, warships from both Navies regularly make port calls at each other's ports. Both Navies have also been cooperating towards exploring new avenues for collaboration with a shared aim of a '*Free, Open and inclusive Indo-Pacific*.

https://pib.gov.in/PressReleasePage.aspx?PRID=1763116

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 12 Oct 2021 9:51AM

अमेरिका के नौसेना आपरेशन प्रमुख एडमिरल माइकल गिल्डे की भारत यात्रा

अमेरिका के नौसेना आपरेशन प्रमुख एडमिरल गिल्डे 11 से 15 अक्टूबर, 2021 तक भारत की पांच दिवसीय आधिकारिक यात्रा पर हैं। यात्रा के दौरान, एडमिरल गिल्डे नौसेना प्रमुख एडमिरल करमबीर सिंह के साथ मुलाकात करेंगे। इसके अलावा वे भारत सरकार के अन्य वरिष्ठ अधिकारियों से मिलेंगे। एडमिरल गिल्डे भारतीय नौसेना के पश्चिमी नौसेना कमान (मुंबई) और पूर्वी नौसेना कमान (विशाखापत्तनम) का दौरा करेंगे, जहां वह संबंधित प्रमुख कमांडरों के साथ बातचीत करेंगे। एडमिरल गिल्डे एक भारतीय प्रतिनिधिमंडल के साथ भारत के पूर्वी तट पर यूएसएन कैरियर स्ट्राइक ग्रुप के जहाज पर भी सवार होंगे।

भारत और अमेरिका के बीच परंपरागत रूप से घनिष्ठ और मैत्रीपूर्ण संबंध रहे हैं। दोनों देशों के बीच रक्षा संबंध आपसी विश्वास और भरोसे का रहा है, जो जून 2016 में भारत को प्रमुख 'रक्षा भागीदार का दर्जा' दिए जाने के समझौते के बाद और अधिक मजबूत हो गया है। इसके अलावा, दोनों देशों ने कुछ मूलभूत समझौते किए हैं, जिनमें 2015 में हस्ताक्षरित रक्षा ढाँचा समझौता शामिल है, जो दोनों देशों के रक्षा प्रतिष्ठानों के बीच सहयोग के लिए एक रूपरेखा प्रदान करता है। 2016 में हस्ताक्षरित लॉजिस्टिक्स एक्सचेंज मेमोरेंडम ऑफ एग्रीमेंट (एलईएमओए), जो दोनों के सशस्त्र बलों के बीच पारस्परिक लॉजिस्टिक्स सहयोग की सुविधा प्रदान करने वाला एक मूलभूत समझौता है। 06 सितंबर 2018 को हस्ताक्षर किए गए संचार संगतता और सुरक्षा समझौता (कॉमकासा) दोनों देशों के सशस्त्र बलों के बीच सूचना-साझा करने की सुविधा प्रदान करता है और हाल ही में बुनियादी विनिमय सहयोग समझौता (बीईसीए) किया गया, जो रक्षा मंत्रालय और अमेरिका की राष्ट्रीय भू-स्थानिक एजेंसी (एनजीए) के बीच भू-स्थानिक जानकारी साझा करने में सक्षम बनाता है।

भारतीय नौसेना कई मुद्दों पर अमेरिकी नौसेना के साथ घनिष्ठ रूप से सहयोग करती है, जिसमें मालाबार और रिमपैक अभ्यास श्रृंखला जैसे परिचालन संबंधी सहयोग, प्रशिक्षण आदान-प्रदान, वाणिज्यिक जहाजों की आवाजाही की सूचना का आदान-प्रदान और विभिन्न क्षेत्रों के विषय विशेषज्ञों शामिल हैं। इन सभी को सालाना आयोजित कार्यकारी संचालन समूह (ईएसजी) की बैठकों के माध्यम से समन्वित किया जाता है। इसके अलावा, दोनों नौसेनाओं के युद्धपोत नियमित रूप से एक-दूसरे के बंदरगाहों पर पोर्ट कॉल करते हैं। दोनों नौसेनाएं 'मुक्त, खुले और समावेशी हिंद-प्रशांत क्षेत्र' के साझा उद्देश्य के साथ सहयोग के लिए नए रास्ते तलाशने की दिशा में भी काम कर रही हैं।

https://pib.gov.in/PressReleasePage.aspx?PRID=1763171

FINANCIAL EXPRESS
Read to Lead

Wed, 13 Oct 2021

Indian Army Chief heads to Sri Lanka; Deepening of military ties to be the focus

During his visit, the Indian Army Chief will have discussions with the top military leadership of that country and explore ways for further deepening military ties

By Huma Siddiqui

In view of China's growing influence in the neighbouring island nation Sri Lanka, Indian Army Chief Gen MM Naravane has reached the island nation on a five day visit. Gen Naravane's visit to neighbouring Sri Lanka follows the recently concluded visit of Foreign Secretary Harsh Shringla's visit to that country. The visit assumes importance as India has been raising concerns over China's presence in that country as well as in the Indian Ocean Region which is posing threat to New Delhi's interests.

The Government of Sri Lanka has plans to appoint a Defence Advisor in the mission in New Delhi. (Twitter/ADG PI - Indian Army)

Agenda during the five day visit

The Army Chief who is on his maiden visit to that country was received by the Sri Lankan Chief of Defence Staff General Shavendra Silva.

During his visit, the Indian Army Chief will have discussions with the top military leadership of that country and explore ways for further deepening military ties. His meetings are scheduled to take place with the Service Chiefs, visit the Headquarters of the Sri Lankan Army, the Gajaba Regimental Headquarters and the Sri Lankan Military Academy.

While there, the Indian Army chief will witness the ongoing military drill Mitra Shakti. The drill will be ending on October 15, 2021.

India & Sri Lanka Military Cooperation

The military cooperation between the two countries include – joint training and exercises, regular high level visits, ship visits and sports interactions and around 50 per cent of all foreign military training slots in India are allocated to Sri Lankan defence personnel.

In August 2021, a report titled "Integrated Country strategy, for the Sri Lanka Diplomatic Missions in India for 2021-23" by the High Commission of Sri Lanka, states "expansion of collaboration in the fields of strategic cooperation, defence and Indian Ocean security between the two countries has been identified."

The report has suggested the focus will be on working toward the development of mechanisms that enhance political level strategic cooperation in the fields of security and defence.

Facilitating bilateral joint military exercises, increased high-level military exchanges as well as study tours.

The Government of Sri Lanka has plans to appoint a Defence Advisor in the mission in New Delhi.

India & Sri Lanka Mitra Shakti

120 personnel of the Indian Army are in Sri Lanka participating in the 8th edition of India-Sri Lanka bilateral joint Exercise.

Ex-Mitra Shakti is being conducted in Ampara at Combat Training School, Sri Lanka from Oct 4-15, 2021.

Aim of Ex Mitra Shakti

Indian army's all arms contingent and a battalion of Sri Lanka is in the joint drill focusing on inter-operability, sharing best practices in counter terrorism and counter-insurgency operations.

An all arms contingent of 120 personnel of the Indian Army will participate in the exercise along with a battalion of the Sri Lankan Army. The aim is to promote close relations between the armies of the two sides and enhance inter-operability and sharing best practices in counter insurgency and counter terrorism operations.

It involves tactical level operations at sub unit level in an international Counter Insurgency and Counter Terrorism environment, as this will help in bringing synergy and cooperation at grass root level between the armies of India and Sri Lanka.

https://www.financialexpress.com/defence/indian-army-chief-heads-to-sri-lanka-deepening-of-military-ties-to-be-the-focus/2348839/

THE WEEK

Wed, 13 Oct 2021

Indian Army rebalances command structure on China border

India's military focus, which has been largely Pakistan-centric, is turning to China

By Pradip R Sagar

As the stalemate continues on the icy heights of the Himalayas between Indian and Chinese militaries, both sides are going ahead with plans of deploying over 60,000 troops on the frontiers for a second successive winter in eastern Ladakh.

[File] India's Border Security Force (BSF) soldiers stand guard at a checkpoint along a highway leading to Ladakh, at Gagangeer in Kashmir's Ganderbal district June 17, 2020 | Reuters

While China has changed its local commanders on the western theatre command—overseeing the Line of Actual Control (LAC)—the Indian Army is also rebalancing its force on the Indo-China border.

Army Chief General Manoj Mukund Naravane recently stated that the build-up and construction of infrastructure by the Chinese on their side meant they were there to stay.

"If they are here to stay, we are here to stay, too," said Naravane.

The move is also a step towards upcoming theatre commands in the Indian military. While India has eight commands (Army and IAF) focusing on the China front, it has just one unified command—the western theatre command—tasked with guarding its border with India.

The Indian military functions under 17 single-service commands now.

The Indian Army's Lucknow-based Central Command has been given control over the additional brigades to strengthen its position on the LAC in Uttarakhand and Himachal Pradesh.

While the Kolkata-based Eastern Command will look after the India-China border in Arunachal Pradesh and Sikkim, Ladakh is the responsibility of the Northern Command.

The Dehradun-based division, which is a strike force, has been put under the Central Command instead of its Western Command.

Similarly, another infantry brigade of over 5,000 troops is also taken away from the Western Command and handed over to the Central Command.

It is clarified the move is only administrative control of the formations and deployment of additional troops is not being done.

India's military focus has been largely Pakistan-centric. Of the 14 Army corps, just four-and-a-half faced China.

Similarly, just 12 of the Army's 38 divisions faced China; 25 were on the India-Pakistan border and one division was a reserve under Army headquarters.

The Army has four strike corps—the Mathura-based I Corps, the Ambala-based II Corps, the Bhopal-based XXI Corps and the partially-raised XVII Corps. Only the XVII Corps focuses on China.

But, due to the ongoing military face-off in Ladakh, the Sena Bhawan in New Delhi has carried out the rebalancing to focus more on China.

The I Corps will now be an offensive formation for eastern Ladakh to support the Leh-based XIV Corps. The Allahabad-based 4 Division and the Bareilly-headquartered 6 Mountain Division will form the core of the I Corps.

In case of aggression, the Hisar-based 33 Armoured Division could also be moved to Ladakh. The Palampur-based 39 Division will be a reserve force and the Dehradun-based 14 Division will be deployed along the Chinese border in Uttarakhand.

The XVII Corps, which was earlier mandated to cover the entire northern border, will be restricted to Sikkim and the northeast. For the eastern sector, the Kolkata-based Eastern Command has three corps—IV, III and XXXIII—based in Tezpur, Dimapur and Siliguri, respectively.

https://www.theweek.in/news/india/2021/10/12/indian-army-rebalances-command-structure-on-china-border.html

Hindustan Times

Wed, 13 Oct 2021

Malabar drill may expand in future: US Navy Chief

Gilday's comments came on a day India, the US, Japan and Australia kicked off the second phase of this year's Malabar naval drills in the Bay of Bengal, with the exercise seeking to build on the synergy and interoperability developed during the first phase held in August.

By Rahul Singh

New Delhi: The scope of the multi-nation Malabar exercise in terms of more like-minded navies taking part in the drills could expand in future, Chief of US Naval Operations Admiral Michael Gilday said on Tuesday, adding that it was for the Quad partners to discuss the possibility of an expansion.

His comments came on a day India, the US, Japan and Australia kicked off the second phase of this year's Malabar naval drills in the Bay of Bengal, with the exercise seeking to build on the synergy and interoperability developed during the first phase held in August.

US Navy chief Admiral Michael Gilday said the cyber domain is one area that the Quad navies would continue to refine in terms of working together as well as high-end operations in the air, on the sea and under the sea. (Tweeted by Indian Navy)

"In future, that exercise could expand. It is for the partners inside the Quad to discuss that. But remember there are many exercises that go on in the Indo-Pacific and globally which bring like-minded navies and partners together," Gilday said, in response to a question on the possibility of more navies coming

together under the Malabar banner. He is in India on a five-day official visit.

The second phase of Malabar exercise is being conducted from October 12 to 15. Gilday said the cyber domain is one area that the Quad navies would continue to refine in terms of working together as well as high-end operations in the air, on the sea and under the sea.

"We are committed to operationalizing our #USIndiaDefense partnership, including through enhanced information-sharing, regional security, and exercising at sea together," he wrote on Twitter.

The Quad navies conducted the first phase of the exercise off the Pacific Ocean island of Guam from August 26-29. It involved destroyers, frigates, corvettes, submarines, helicopters, long-range maritime patrol aircraft and elite special forces elements including the US Navy SEALs and the Indian Navy's marine commandos (MARCOS).

The Indian Navy is taking part in the exercise's second phase with INS Ranvijay, INS Satpura, P-8I long range maritime patrol aircraft and a submarine, the US Navy is represented by the aircraft carrier USS Carl Vinson along with USS Lake Champlain and USS Stockdale, Japan is taking part with JS Kaga and JS Murasame and the Royal Australian Navy has sent HMAS Ballarat and HMAS Sirius for the drills.

Malabar began as an annual bilateral naval exercise between India and the US in 1992. It has increased in scope and complexity over the years.

It was in the 2005 edition of the drills that the aircraft carriers from the Indian and the US Navy operated together for first time. In 2014, the Japanese Maritime Self Defence Force (JMSDF) became a permanent participant in the drills followed by Australia in 2020.

The Quad navies had earlier carried out complex naval drills under the Malabar banner in November 2020 in the Arabian Sea and the Bay of Bengal.

Wary of the Quad, China has been monitoring its activities closely. The Quad was revived in late 2017 by India, the US, Australia and Japan, and Beijing's suspicions have increased since the four countries upgraded the forum to the ministerial level in 2019.

From carrying out naval drills with like-minded countries to reaching out to states in the Indian Ocean Region (IOR), the Indian Navy is focusing on checking China's rising ambitions in the region and sending out a strong message that Beijing's power play in South China Sea cannot be replicated in the Indian Ocean.

https://www.hindustantimes.com/india-news/malabar-drill-may-expand-in-future-us-navy-chief-101634062642165.html

Wed, 13 Oct 2021

Researchers realize quantum teleportation onto mechanical motion of silicon beams

Quantum technology typically employs qubits (quantum bits) consisting of, for example, single electrons, photons or atoms. A group of TU Delft researchers has now demonstrated the ability to teleport an arbitrary qubit state from a single photon onto an optomechanical device—consisting of a mechanical structure comprising billions of atoms. Their breakthrough research, now published in *Nature Photonics*, enables real-world applications such as quantum internet repeater nodes while also allowing quantum mechanics itself to be studied in new ways.

Credit: Umberto on Unsplash

Quantum optomechanics

The field of quantum optomechanics uses optical means to control mechanical motion in the quantum regime. The first quantum effects in microscale mechanical devices were demonstrated about ten years ago. Focused efforts have since resulted in entangled states between optomechanical devices as well as demonstrations of an optomechanical quantum memory. Now, the group of Simon Gröblacher, of the Kavli Institute of Nanoscience and the Department of Quantum Nanoscience at Delft University of Technology, in collaboration with researchers from the University of Campinas in Brazil, has shown the first successful teleportation of an arbitrary optical qubit state onto a micromechanical quantum memory.

Repeater nodes for a quantum internet

Quantum teleportation—the faithful transfer of an unknown input quantum state onto a remote quantum system—is a key component of long-distance quantum communication protocols needed to build a quantum internet. Just like the regular internet, distribution of quantum information between quantum devices anywhere in the world will require a network of repeater nodes. Each node will temporarily store the quantum information in a memory before teleporting it to a subsequent node, ultimately establishing long-distance quantum communication.

Two micromechanical resonators sharing a single quantum state

In their experiment, the researchers create a polarization-encoded photonic qubit in an arbitrary quantum state. They then transport this photon over tens of meters of optical fiber and teleport it onto their quantum memory comprised of two massive, mechanical silicon resonators—each about 10 micrometers in size and consisting of tens of billions of atoms. The quantum information was stored in the single-excitation subspace of the two resonators. To test the reliability of the process, the researchers further demonstrated that they could faithfully retrieve this teleported state from the memory.

Telecom wavelengths

Although quantum teleportation has already been demonstrated in various quantum systems, the use of optomechanical devices is a breakthrough because they can be designed to operate at any optical wavelength, including the low-loss infrared telecom fiber wavelengths. "It is this wavelength that results in the lowest transmission loss, allowing the longest distance between

repeater nodes," Gröblacher says. "This milestone was possible due to the quality and flexibility of our nanofabricated optomechanical systems, which, unlike most other quantum systems, allow for independently engineered optical properties. A future quantum internet will undoubtedly make use of the existing telecom network at this wavelength."

All the building blocks

In principle, quantum teleportation can be done over arbitrary distances. By teleporting a photonic quantum state over tens of meters of optical fiber onto a quantum memory, the researchers have demonstrated the requirement for a fully functional optomechanical quantum repeater node. Gröblacher: "We now have to further improve the performance to the level required for a system that can be deployed in a real-world application, such as increasing the repetition rates, fidelities and the success-rate of the qubit teleportation and storage." According to Thiago Alegre, researcher at the University of Campinas and collaborator on this project, one route will be to design optomechanical systems that are resilient to parasitic optical absorption. "This can be realized due to the flexibility of these nanofabricated devices."

A hybrid approach

The current research is a big step towards Gröblacher's vision of a future hybrid quantum internet. "We are working towards a heterogeneous network where you have various physical systems communicating and performing different functionalities," he says. "You may have optomechanical quantum repeater nodes connected to a quantum computer or memory consisting of superconducting qubits or spin quantum systems, respectively. All of these will have to be compatible with one another and operate at the same wavelength in order to faithfully transfer quantum information."

Quantum-to-classical transition

Besides enabling building blocks for novel quantum technologies, the ability to teleport an arbitrary qubit state onto massive, mechanical oscillators can also be used for testing quantum physics itself at a fundamental level. Whereas very small systems typically behave according to the laws of quantum mechanics, large systems are governed by the classical laws of physics. "Experiments have excluded certain theories describing decoherence mechanisms leading to the quantum-to-classical transition, but we are far away from a definitive answer," Gröblacher says. "As it is relatively easy to scale our optomechanical systems and to use teleportation to create interesting quantum states, this is an important step in understanding this boundary."

More information: Niccolò Fiaschi et al, Optomechanical quantum teleportation, *Nature Photonics* (2021). DOI: 10.1038/s41566-021-00866-z

Journal information: *Nature Photonics*

https://phys.org/news/2021-10-quantum-teleportation-mechanical-motion-silicon.html

Wed, 13 Oct 2021

Ultrafast and coupled: Atomic vibrations in the quantum material boron nitride

Materials consisting of a few atomic layers display properties determined by quantum physics. In a stack of such layers, vibrations of the atoms can be triggered by infrared light. New experimental and theoretical work shows that atomic vibrations within the layers of hexagonal boron nitride, the so-called transverse optical phonons, couple directly to motions of the layers against each other. For a period of some 20 ps, the coupling results in a frequency down-shift of the optical phonons and their optical resonance. This behavior is a genuine property of the quantum material and of interest for applications in high-frequency optoelectronics.

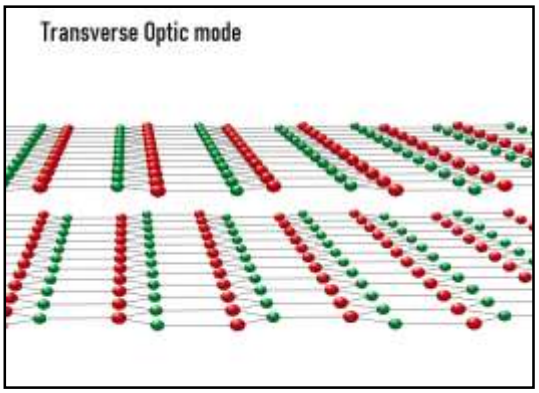


Fig 1: 3 of 4 Transverse Optic mode. Credit: Forschungsverbund Berlin e.V. (FVB)

Hexagonal boron nitride consist of layers in which covalently bonded boron and nitrogen atoms form a regular array of six-rings (Fig. 1). Neighboring layers are coupled via the much weaker van der Waals interaction. Vibrations of boron and nitrogen atoms in the layer, the so-called transverse optical (TO) phonons, show an oscillation frequency on the order of 40 Terahertz (THz, 4×10^{13}vibrations per second) which is ten to hundred times higher than that of shear and breathing motions of the layers relative to each other. So far, there was nearly no insight into the lifetime of such motions after optical excitation and into their coupling.

An international collaboration of scientists from Berlin, Montpellier, Nantes, Paris and Ithaca (U.S.) now presents detailed experimental and theoretical results on ultrafast dynamics of coupled phonons in few-layer hexagonal boron nitride (*Physical Review B* 104, L140302 (2021)). Transverse optical (TO) phonons in a stack of eight to nine boron nitride layers display a lifetime of 1.2 ps (1 ps = 10^{-12} s), while shear and breathing modes show a decay time of 22 ps (Fig. 2b). Such lifetimes were directly measured in femtosecond pump-probe experiments and are in very good agreement with values derived from a theoretical analysis of the phonon decay channels.

Excitations of shear and breathing modes induce a characteristic spectral down-shift of the TO phonon resonance in the optical spectra (Fig. 2a). Theoretical calculations give the coupling energy between the different modes of the layer stack and show that the corresponding coupling is negligibly small in a bulk boron nitride crystal consisting of many layers. Thus, the observed coupled vibrational dynamics represent a genuine property of the quantum material.

The spectral shift of the TO phonon resonance in the optical spectra is a nonlinear optical effect which can be induced by light of moderate power. This is of interest for applications in optoelectronics and holds potential for optical modulators and switches in the giga- to terahertz frequency range.

More information: Taehee Kang et al, Ultrafast nonlinear phonon response of few-layer hexagonal boron nitride, *Physical Review B* (2021). DOI: 10.1103/PhysRevB.104.L140302

Journal information: *Physical Review B*

https://phys.org/news/2021-10-ultrafast-coupled-atomic-vibrations-quantum.html

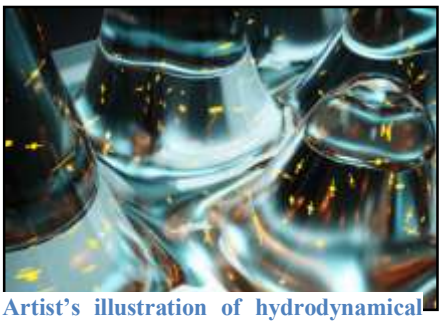
PHYS.ORG

Wed, 13 Oct 2021

Researchers unlock secret path to a quantum future

By Rachel Berkowitz

In 1998, researchers including Mark Kubinec of UC Berkeley performed one of the first simple quantum computations using individual molecules. They used pulses of radio waves to flip the spins of two nuclei in a molecule, with each spin's "up" or "down" orientation storing information in the way that a "0" or "1" state stores information in a classical data bit. In those early days of quantum computers, the combined orientation of the two nuclei—that is, the molecule's quantum state—could only be preserved for brief periods in specially tuned environments. In other words, the system quickly lost its coherence. Control over quantum coherence is the missing step to building scalable quantum computers.



Artist's illustration of hydrodynamical behavior from an interacting ensemble of quantum spin defects in diamond. Credit: Norman Yao/Berkeley Lab

Now, researchers are developing new pathways to create and protect quantum coherence. Doing so will enable exquisitely sensitive measurement and information processing devices that function at ambient or even extreme conditions. In 2018, Joel Moore, a senior faculty scientist at Lawrence Berkeley National Laboratory (Berkeley Lab) and professor at UC Berkeley, secured funds from the Department of Energy to create and lead an Energy Frontier Research Center (EFRC) – called the Center for Novel Pathways to Quantum Coherence in Materials (NPQC) – to further those efforts. "The EFRCs are an important tool for DOE to enable focused inter-institutional collaborations to make rapid progress on forefront science problems that are beyond the scope of individual investigators," said Moore.

Through the NPQC, scientists from Berkeley Lab, UC Berkeley, UC Santa Barbara, Argonne National Laboratory, and Columbia University are leading the way to understand and manipulate coherence in a variety of solid-state systems. Their threefold approach focuses on developing novel platforms for quantum sensing; designing two-dimensional materials that host complex quantum states; and exploring ways to precisely control a material's electronic and magnetic properties via quantum processes. The solution to these problems lies within the materials science community. Developing the ability to manipulate coherence in realistic environments requires in-depth understanding of materials that could provide alternate quantum bit (or "qubit"), sensing, or optical technologies.

Basic discoveries underlie further developments that will contribute to other DOE investments across the Office of Science. As the program enters its fourth year, several breakthroughs are laying the scientific groundwork for innovations in quantum information science.

More defects, more opportunities

Many of NPQC's achievements thus far focus on quantum platforms that are based on specific flaws in a material's structure called spin defects. A spin defect in the right crystal background can approach perfect quantum coherence, while possessing greatly improved robustness and functionality.

These imperfections can be used to make high-precision sensing platforms. Each spin defect responds to extremely subtle fluctuations in the environment; and coherent collections of defects can achieve unprecedented accuracy and precision. But understanding how coherence evolves in a system of many spins, where all the spins interact with one another, is daunting. To meet this

challenge, NPQC researchers are turning to a common material that turns out to be ideal for quantum sensing: diamond.

In nature, each carbon atom in a diamond's crystal structure connects to four other carbon atoms. When one carbon atom is replaced by a different atom or omitted altogether, which commonly occurs as the diamond's crystal structure forms, the resulting defect can sometimes behave like an atomic system that has a well-defined spin—an intrinsic form of angular momentum carried by electrons or other subatomic particles. Much like these particles, certain defects in diamond can have an orientation, or polarization, that is either "spin-up" or "spin-down."

By engineering multiple different spin defects into a diamond lattice, Norman Yao, a faculty scientist at Berkeley Lab and an assistant professor of physics at UC Berkeley, and his colleagues created a 3D system with spins dispersed throughout the volume. Within that system, the researchers developed a way to probe the "motion" of spin polarization at tiny length scales.

Using a combination of measurement techniques, the researchers found that spin moves around in the quantum mechanical system in almost the same way that dye moves in a liquid. Learning from dyes has turned out to be a successful path toward understanding quantum coherence, as recently published in the journal Nature. Not only does the emergent behavior of spin provide a powerful classical framework for understanding quantum dynamics, but the multi-defect system provides an experimental platform for exploring how coherence works as well. Moore, the NPQC director and a member of the team who has previously studied other kinds of quantum dynamics, described the NPQC platform as "a uniquely controllable example of the interplay between disorder, long-ranged dipolar interactions between spins, and quantum coherence."

Those spin defects' coherence times depend heavily on their immediate surroundings. Many NPQC breakthroughs have centered on creating and mapping the strain sensitivity in the structure surrounding individual defects in diamond and other materials. Doing so can reveal how best to engineer defects that have the longest possible coherence times in 3D and 2D materials. But exactly how might the changes imposed by forces on the material itself correlate to changes in the defect's coherence?

To find out, NPQC researchers are developing a technique for creating deformed areas in a host crystal and measuring the strain. "If you think about atoms in a lattice in terms of a box spring, you get different results depending on how you push on them," said Martin Holt, group leader in electron and X-ray microscopy at Argonne National Laboratory and a principal investigator with NPQC. Using the Advanced Photon Source and Center for Nanoscale Materials, both user facilities at Argonne National Laboratory, he and his colleagues offer a direct image of the deformed areas in a host crystal. Until now, a defect's orientation in a sample has been mostly random. The images reveal which orientations are the most sensitive, providing a promising avenue for high-pressure quantum sensing.

"It's really beautiful that you can take something like diamond and bring utility to it. Having something simple enough to understand the basic physics but that also can be manipulated enough to do complex physics is great," said Holt.

Another goal for this research is the ability to transfer a quantum state, like that of a defect in diamond, coherently from one point to another using electrons. Work by NPQC scientists at Berkeley Lab and Argonne Lab studies special quantum wires that appear in atomically thin layers of some materials. Superconductivity was unexpectedly discovered in one such system, a triple layer of carbon sheets, by the group led by Feng Wang, a Berkeley Lab faculty senior scientist and UC Berkeley professor, and leader of NPQC's effort in atomically thin materials. Of this work, published in *Nature* in 2019, Wang said, "The fact that the same materials can offer both protected one-dimensional conduction and superconductivity opens up some new possibilities for protecting and transferring quantum coherence."

Toward useful devices

Multi-defect systems are not only important as fundamental science knowledge. They also have the potential to become transformative technologies. In novel two-dimensional materials that are

paving the way for ultra-fast electronics and ultra-stable sensors, NPQC researchers investigate how spin defects may be used to control the material's electronic and magnetic properties. Recent findings have offered some surprises.

"A fundamental understanding of nanoscale magnetic materials and their applications in spintronics has already led to an enormous transformation in magnetic storage and sensor devices. Exploiting quantum coherence in magnetic materials could be the next leap towards low-power electronics," said Peter Fischer, senior scientist and division deputy in the Materials Sciences Division at Berkeley Lab.

A material's magnetic properties depend entirely on the alignment of spins in adjacent atoms. Unlike the neatly aligned spins in a typical refrigerator magnet or the magnets used in classical data storage, antiferromagnets have adjacent spins that point in opposite directions and effectively cancel each other out. As a result, antiferromagnets don't "act" magnetic and are extremely robust to external disturbances. Researchers have long sought ways to use them in spin-based electronics, where information is transported by spin instead of charge. Key to doing so is finding a way to manipulate spin orientation and maintain coherence.

In 2019 NPQC researchers led by James Analytis, a faculty scientist at Berkeley Lab and associate professor of physics at UC Berkeley, with postdoc Eran Maniv, observed that applying a small, single pulse of electrical current to tiny flakes of an antiferromagnet caused the spins to rotate and "switch" their orientation. As a result, the material's properties could be tuned extremely quickly and precisely. "Understanding the physics behind this will require more experimental observations and some theoretical modeling," said Maniv. "New materials could help reveal how it works. This is the beginning of a new research field."

Now, the researchers are working to pinpoint the exact mechanism that drives that switching in materials fabricated and characterized at the Molecular Foundry, a user facility at Berkeley Lab. Recent findings, published in Science Advances and Nature Physics, suggest that fine-tuning the defects in a layered material could provide a reliable means of controlling the spin pattern in new device platforms. "This is a remarkable example of how having many defects lets us stabilize a switchable magnetic structure," said Moore, the NPQC leader.

Spinning new threads

In its next year of operation, NPQC will build on this year's progress. Goals include exploring how multiple defects interact in two-dimensional materials and investigating new kinds of one-dimensional structures that could arise. These lower-dimensional structures could prove themselves as sensors for detecting other materials' smallest-scale properties. Additionally, focusing on how electric currents can manipulate spin-derived magnetic properties will directly link fundamental science to applied technologies.

Rapid progress in these tasks requires the combination of techniques and expertise that can only be created within a large collaborative framework. "You don't develop capabilities in isolation," said Holt. "The NPQC provides the dynamic research environment that drives the science and harnesses what each lab or facility is doing." The research center meanwhile provides a unique education at the frontiers of science including opportunities for developing the scientific workforce that will lead the future quantum industry.

The NPQC brings a new set of questions and goals to the study of the basic physics of quantum materials. Moore said, "Quantum mechanics governs the behavior of electrons in solids, and this behavior is the basis for much of the modern technology we take for granted. But we are now at the beginning of the second quantum revolution, where properties like coherence take center stage, and understanding how to enhance these properties opens a new set of questions about materials for us to answer."

More information: C. Zu et al, Emergent hydrodynamics in a strongly interacting dipolar spin ensemble, *Nature* (2021). DOI: 10.1038/s41586-021-03763-1

Journal information: *Nature*

https://phys.org/news/2021-10-secret-path-quantum-future.html

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Dalhousie researchers able to detect COVID-19 in waste water sampling

By Amber Fryday

Twenty-three-year-old PhD student Emalie Hayes is currently studying Civil Engineering at Dalhousie University. Last year, she created a COVID-19 testing device that can detect the virus through sewers.

The COVID-19 sewer cage, called the Cosca, is made by a 3D printer out of plastic, which takes several hours to print, and is then assembled by hand, which takes less than a minute.

"The Cosca is deployed into our sewer systems and it is able to sit in the flow of the wastewater. It contains an absorbent material that is able to interact with the wastewater and absorb any viral particles. We then pull the Cosca up from the wastewater and we're able to analyze it in the lab," said Hayes.

In comparison to traditional methods of waste water sampling that can be expensive, the Cosca is very cost-efficient, something Hayes wanted to consider when coming up with the design.

"It's only about a dollar to print them and to analyze them," she said.

To date, there are several units around the Halifax area and monitoring the residences at Dalhousie University, as well.

So far, around 100 of the devices have been sold across Canada and as far as France, the United Kingdom and Australia. The team has also donated some for research initiatives.

"We've been able to detect the virus using these in the North West Territories," said Gen Erjavec, who is a research assistant.

Erjavec has been assisting with the research since the beginning of this year and says it has been a surreal experience.

"This project is so innovative and we're always learning new things every day. To be a part of surveying the waste water in the region for COVID-19, it's been incredible and I feel very grateful to be a part of this important research."

Hayes says she is excited to see where she can take the research from here.

"I really think we can utilize this method beyond the COVID-19 pandemic, so I am really excited and passionate about this."

https://globalnews.ca/news/8260663/covid-19-waste-water-sampling/