June 2021

समाचार पत्रों से चयित अंश
Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

खंड : 46 अंक : 118 17 जून 2021

Vol.: 46 Issue : 118 17 June 2021

रक्षा विज्ञान पुस्तकालय
Defence Science Library
रक्षा वैज्ञानिक सूचना एवं प्रलेखन केंद्र
Defence Scientific Information & Documentation Centre
मेटकॉफ हाउस, दिल्ली - 110 054
Metcalfe House, Delhi - 110 054

CONTENTS

DRDO News

DRDO Technology News

The EurAsian Times

Thu, 17 June 2021

Pakistan 'Beats' India in no. of nuclear weapons but 'Far Behind' in delivery mechanism — SIPRI Report

By Apoorva Jain

The number of nuclear weapons that India possesses is fewer than that of its twin rivals — China and Pakistan, according to the Stockholm International Peace Research Institute's (SIPRI) analysis of the global nuclear weapons.

This report comes at a time when India and China mark one year of the deadly Galwan Valley clash amid a continuing standoff at the LAC.

According to the 2021 Yearbook on *Armament, Disarmament and International Security by SIPRI*, the world continues to modernize nuclear warheads, missile and aircraft delivery systems, and nuclear weapon production facilities.

File Image: Agni Missile – Wikimedia Commons

Key Findings For 2021

The nine nuclear-armed states — the United States, Russia, the United Kingdom, France, China, India, Pakistan, Israel and the Democratic People's Republic of Korea (North Korea)— together possessed an estimated 13,080 nuclear weapons at the start of 2021, a slight decrease from 13,400 in 2020, the SIPRI report shows.

Despite a slight decrease in total warheads of the erstwhile cold war rivals, more than 90% of nuclear weapons are possessed by the US and Russia — close to 5550 and 6255.

The total number of deployed warheads with operational capacity has increased by 105 units to 3825. More than 50% of these remain in possession of Russia and the US.

India's Twin Troubles – China & Pakistan

Both India and Pakistan increased the number of nuclear warheads by less than 5% as compared to last year's assessment. India now has a total of 156 warheads, a little behind Pakistan that has 165.

Meanwhile, China's nuclear arsenal grew by 9%, up from 320 to 350 in one year.

China's nuclear tests date back to 1964 and continued until 1996, which is said to be its 45th test overall. China was recognized as one of the world's five 'weapons states', while India was excluded from such status. China is also one of the P-5 countries (permanent members of the UN Security Council).

It remains committed to the Non-Proliferation Treaty (NPT) 1968 that prohibits all countries except the P-5 (US, UK, France, Russia and China) from possessing nuclear weapons. China has been critical of nuclear proliferation in its backyard.

"China has never admitted that India and Pakistan are nuclear weapons states," China's foreign ministry spokesman Lu Kang had earlier said.

India's nuclear program is said to have begun in the aftermath of the 1962 war with China whereas Pakistan began to prioritize the industry after its defeat in the 1971 Bangladesh liberation war.

India conducted its first nuclear test in 1974 followed by a series of tests after a gap of 22 years, in 1998. India's nuclear doctrine is committed to "no first use" policy and has defended its nuclear program on "deterrence" grounds.

Pakistan denoted six nuclear bombs in the course of four days in 1998 as well.

"Pakistan continues to prioritize the development and deployment of new nuclear weapons and delivery systems as part of its full-spectrum deterrence posture vis-à-vis India," according to SIPRI.

The report also called out both countries on low levels of transparency. "The governments of India and Pakistan make statements about some of their missile tests but provide no information about the status or size of their arsenals," it said.

Experts fear an increase in nuclear deterrence capacity will trigger an arms race between the two that will have wider repercussions for the whole South Asian region.

The race for nuclear supremacy

While India has a stronger and larger military force than its historic adversary, the nuclear capabilities of both are similar.

India has the advantage of possessing a nuclear-triad, the ability to launch nuclear weapons by air, land, and sea. Pakistan is yet to possess sea launching capabilities.

India's nuclear arsenal includes ballistic missiles, nuclear-powered ballistic missile submarines and fighter jets that can drop nuclear weapons on marked targets.

India's range of short to medium-range Agni ballistic missiles along with its variants and Prithvi missiles currently make up for most of the land-based nuclear arsenal. India is on course to operationalize its second-nuclear powered submarine, INS Arighat after the first one, INS Arihant operationalized in 2018.

The induction of Rafael jets, in addition to Mirage 2000 and Jaguar fighters, increases the country's nuclear bombs carrying capacity as well as nuclear deterrence missions.

Among Pakistan's nuclear arsenal, the long-range ballistic missile Shaheen-3 is capable of targeting India's Andaman and Nicobar islands as far as the eastern coast of India.

A worry for India is the consistent rise of China militarily and economically. It carried out tests on the first nuclear submarine launched way back in 1981. Since then, China has rapidly enhanced its nuclear program.

According to US government sources, it has four such submarines in operation with two more under construction. With possession of a range of intercontinental ballistic missiles (ICBM), tactical cruise missiles and the ability to chemical and biological weapons, China is diversifying its strategic nuclear capabilities.

China is in the middle of significant modernization and expansion of its nuclear weapon inventory, and India and Pakistan also appear to be expanding their nuclear arsenals, according to the yearbook.

The Treaty on the Prohibition of Nuclear Weapons entering into force this January 21, 2021, brings a sliver of hope for disarmament activists and civil society members.

"The TPNW is the first treaty to establish a comprehensive ban on nuclear weapons, including their development, deployment, possession, use and threat of use," as per SIPRI.

Commenting on the growing divide between nuclear-armed states and the rest, Matt Korda, an associate researcher with SIPRI said that "all investing in the long-term future of their nuclear forces, and other countries that are impatient to see progress on nuclear disarmament promised by the Nuclear Non-Proliferation Treaty".

https://eurasiantimes.com/pakistan-beats-india-in-no-of-nuclear-weapons-but-far-behind-in-delivery-mechanism-sipri-report/

COVID 19: DRDO's Contribution

Press Information Bureau
Government of India

Prime Minister's Office

Wed, 16 June 2021 2:41PM

Establishment of two 250 bedded makeshift Covid Hospitals at Murshidabad and Kalyani in West Bengal through PM CARES

The Prime Minister's Citizen Assistance and Relief in Emergency Situations (PM CARES) Fund Trust has decided to allocate Rs. 41.62 crores for establishment of two 250 bedded makeshift COVID Hospitals by DRDO at Murshidabad and Kalyani, West Bengal. For this, certain infrastructural support would also be provided by the State Government and MoHFW, Govt. of India.

This proposal will augment health infrastructure in West Bengal to effectively manage the COVID situation.

The Prime Minister's Citizen Assistance and Relief in Emergency Situations (PM CARES) Fund Trust had, in its endeavor to support the augmentation of health infrastructure, helped establish COVID Hospitals in Bihar, Delhi, Jammu and Srinagar also.

https://pib.gov.in/PressReleasePage.aspx?PRID=1727485

पत्र सूचना कार्यालय
भारत सरकार

प्रधानमंत्री कार्यालय

Wed, 16 June 2021 2:41PM

पीएम केयर्स के माध्यम से पश्चिम बंगाल के मुर्शिदाबाद और कल्याणी में दो 250 बिस्तरों वाले अस्थायी कोविड अस्पतालों की स्थापना

आपातकालीन स्थितियों में प्रधानमंत्री की नागरिक सहायता और राहत (पीएम केयर्स) कोष ट्रस्ट ने डीआरडीओ द्वारा पश्चिम बंगाल के मुर्शिदाबाद और कल्याणी में दो 250 बिस्तरों वाले अस्थायी कोविड अस्पतालों की स्थापना के लिए 41.62 करोड़ रुपये आवंटित करने का निर्णय लिया है। इसके लिए राज्य सरकार और भारत सरकार के स्वास्थ्य मंत्रालय की ओर से भी कुछ ढांचागत सहायता प्रदान की जाएगी।

यह प्रस्ताव पश्चिम बंगाल में कोविड की स्थिति को प्रभावी ढंग से प्रबंधित करने के लिए स्वास्थ्य के बुनियादी ढांचे में वृद्धि करेगा।

आपातकालीन स्थितियों में प्रधानमंत्री की नागरिक सहायता और राहत (पीएम केयर्स) कोष ट्रस्ट ने स्वास्थ्य संबंधी बुनियादी ढांचे को बढ़ाने के अपने प्रयास के तहत बिहार, दिल्ली, जम्मू और श्रीनगर में भी कोविड अस्पताल स्थापित करने में सहायता की है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1727521

Press Information Bureau
Government of India

ప్రధాన మంత్రి కార్యాలయం

Wed, 16 June 2021 2:41PM

పశ్చిమ బంగాల్ లోని ముర్శిదాబాద్ లోను, కల్యాణి లోను 250 పడకలతో ఉండే రెండు తాత్కాలిక కోవిడ్ ఆసుపత్రుల ను పిఎమ్ కేర్స్ ద్వారా ఏర్పాటు చేయడం జరుగుతుంది.

పశ్చిమ బంగాల్ లోని ముర్శిదాబాద్ లో, కల్యాణి లో 250 పడకల తో ఉండే రెండు తాత్కాలిక కోవిడ్ ఆసుప త్రుల ను డిఆర్‌డిఒ ద్వారా ఏర్పాటు చేయడం కోసం 41.62 కోట్ల రూపాయల ను కేటాయించాలని ప్రైమ్ మినిస్టర్స్ సిటిజన్ అసిస్టెన్స్ ఎండ్ రిలీఫ్ ఇన్ ఇమర్జెన్సి సిట్యువేశన్స్ (పిఎమ్ కేర్స్) ఫండ్ ట్రస్టు నిర్ణయించింది. దీనికోసం భారత ప్రభుత్వ ఆరోగ్యం, కుటుంబ సంక్షేమ మంత్రిత్వ శాఖ తో పాటు ఆ రాష్ట్ర ప్రభుత్వం కూడా మౌలిక స దుపాయాల సంబంధిత మద్ధతు ను కొంత వరకు సమకూర్చడం జరుగుతుంది.

కోవిడ్ స్థితి ని ప్రభావవంతమైన విధం గా నిర్వహించడానికి పశ్చిమ బంగాల్ లో ఆరోగ్య రంగ మౌలిక స దుపాయాల ను ఈ ప్రతిపాదన పెంచనుంది.

ప్రైమ్ మినిస్టర్స్ సిటిజన్ అసిస్టెన్స్ ఎండ్ రిలీఫ్ ఇన్ ఇమర్జెన్సి సిట్యువేశన్స్ (పిఎమ్ కేర్స్) ఫండ్ ట్రస్టు ఆరోగ్య రంగ మౌలిక సదుపాయాల కల్పన ను అభివృద్ధి పరచడం లో తన వంతు తోడ్పాటు ప్రయాసల లో భాగం గా బిహార్, దిల్లీ, జమ్ము, శ్రీనగర్ లలో సైతం కోవిడ్ ఆసుపత్రుల ఏర్పాటు లో సాయాన్ని అందించింది.

https://pib.gov.in/PressReleasePage.aspx?PRID=1727589

Hindustan Times

Thu, 17 June 2021

Bengal to get 2 makeshift Covid hospitals with ₹41cr from PM CARES Fund

While the hospitals will be set up by DRDO, PMO said that certain infrastructure support would also be given by the state government and the Centre

By Umar Sofi

The Prime Minister's Office (PMO) on Wednesday announced that over ₹41 crore have been allocated from the PM CARES Fund to establish two 250-bedmakeshift Covid Hospitals in Murshidabad and Kalyani in West Bengal. While the hospitals will be set up by DRDO, PMO said that certain infrastructure support would also be given by the state government and the Centre.

Representational Image. (HT file)

"This proposal will augment health infrastructure in West Bengal to effectively manage the COVID situation," the PMO said in a statement. To address the medical staff shortage, Prime Minister Narendra Modi will also launch a Customized Crash Course programme for Covid-19 frontline workers on June 18. The course will be imparted at 111 training centres spread over 26 states.

"The programme aims to skill and upskill over one lakh Covid warriors across the country. The training will be imparted to Covid warriors in six customised job roles namely Home Care Support, Basic Care Support, Advanced Care Support, Emergency Care Support, Sample Collection Support, and Medical Equipment Support," the statement said

https://www.hindustantimes.com/india-news/bengal-to-get-2-makeshift-covid-hospitals-with-rs-41cr-from-pm-cares-fund-101623851352284.html

जागरण

Thu, 17 June 2021

पीएम केयर्स फंड से बंगाल के मुर्शिदाबाद और कल्याणी में 250 बेड के अस्थाई कोविड अस्पतालों की होगी स्थापना

अस्पतालों की स्थापना के लिए पीएम केयर्स फंड से 41.62 करोड़ रुपये का फंड आवंटित। कोरोना की दूसरी लहर के बीच केंद्र सरकार ने पीएम केयर्स फंड से बंगाल के मुर्शिदाबाद और कल्याणी में 250 बेड के दो अस्थाई कोविड अस्पतालों की स्थापना का फैसला किया है।

By Priti Jha

कोलकाता: कोरोना की दूसरी लहर के बीच केंद्र सरकार ने पीएम केयर्स फंड से बंगाल के मुर्शिदाबाद और कल्याणी में 250 बेड के दो अस्थाई कोविड अस्पतालों की स्थापना का फैसला किया है। इसके लिए पीएम केयर्स फंड से 41.62 करोड़ रुपये का फंड भी आवंटित कर दिया गया है। बुधवार को एक बयान में इसकी जानकारी दी गई। इसमें बताया गया कि रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) की ओर से मुर्शिदाबाद और कल्याणी में अस्थाई कोविड अस्पतालों की स्थापना की जाएगी।

यानी डीआरडीओ द्वारा ही इसका पूरा इंफ्रास्ट्रक्चर तैयार किया जाएगा। डीआरडीओ को इसमें दक्षता हासिल है। इस कार्य में राज्य सरकार एवं केंद्रीय स्वास्थ व परिवार कल्याण मंत्रालय द्वारा भी ढांचागत सहायता प्रदान की जाएगी।बयान में कहा गया कि इस पहल से बंगाल में कोविड के मामलों से प्रभावी ढंग से निपटने में मदद मिलेगी और स्वास्थ्य बुनियादी ढांचे में भी उल्लेखनीय वृद्धि होगी।

दरअसल केंद्र सरकार ने पीएम केयर्स फंड से स्वास्थ्य बुनियादी ढांचे को बढ़ाने के अपने प्रयास में बिहार, दिल्ली, उत्तर प्रदेश, जम्मू और श्रीनगर में भी कोविड अस्पताल स्थापित करने में मदद की है। बताते चलें कि लोकसभा में कांग्रेस संसदीय दल के नेता और बंगाल के बहरमपुर से सांसद अधीर रंजन चौधरी ने भी प्रधानमंत्री नरेंद्र मोदी को पत्र लिखकर मुर्शिदाबाद में 500 बेड के कोविड अस्पताल की स्थापना के लिए पीएम केयर्स फंड से पैसे आवंटित करने का अनुरोध किया था।

https://www.jagran.com/west-bengal/kolkata-temporary-covid-hospitals-of-250-beds-will-be-set-up-in-murshidabad-and-kalyani-bengal-with-pm-cares-fund-21742713.html

Hindustan Times

Thu, 17 June 2021

DRDO's anti-Covid drug 2-DG effective against all Covid-19 strains, reduces cell death: Study

DRDO's drug against the coronavirus disease (Covid-19), 2-deoxy-D-glucose (2-DG), reduces the multiplicity of the SARS-CoV-2 virus, alleviates cells from infection-induced cytopathic effect (CPE) and cell death, the preliminary study claimed

By Joydeep Bose

A new study has claimed that 2-DG, the drug against coronavirus disease (Covid-19) developed by the Defence Research and Development Organisation (DRDO), is effective against all variants of Covid-19 and even reduces the multiplicity of the SARS-CoV-2 virus. The preliminary study also showed that DRDO's anti-Covid drug alleviates cells from infection-induced cytopathic effect (CPE) and cell death, according to its abstract reviewed by news agency ANI.

Union defence minister Rajnath Singh hands over to Health minister Harsh Vardhan the newly launched anti-COVID drug 2-DG, developed by DRDO, in New Delhi. (File Photo / PTI)

DRDO's Covid-19 drug, 2-deoxy-D-glucose (2-DG), was released amid much tucket by Union ministers Rajnath Singh and Dr. Harsh Vardhan on May 17. While releasing the first batch of DRDO's anti-Covid drug, the central government claimed that the drug has the potential to reduce a patient's average recovery time by two and a half days and oxygen demand by up to 40%. It was provided authorisation for emergency use by the Drugs Controller General of India (DCGI) on June 1 as an adjunct therapy for moderate to severe coronavirus patients.

The new study assessing the viability of DRDO's anti-Covid drug was conducted by Abhishek Kumar, Dhiviya Vedagiri, Annat Narayan Bhatt, Yogesh Rai, and others. It has not been peer-reviewed yet, ANI noted.

DRDO's anti-Covid drug 2-DG was used in the study to aim and inhibit the "metabolic reprogramming" induced by Covid-19 infection in patients suffering from the disease. The results showed that the Covid-19 infection causes a high influx of glucose in the body and glycolysis in the cells, resulting in selective high accumulation of the fluorescent glucose/2-DG analogue and 2-NBDG. The anti-Covid drug from DRDO, 2-DG, subsequently reduces the virus multiplication and alleviates the cells from infection-induced cytopathic effect and cell death, the study found.

Government officials have said that DRDO's anti-Covid drug will be priced at ₹900 per sachet in the market, sold by the Hyderabad-based Dr. Reddy's Laboratories (DRL), although it will provide the drug at discounted prices to the central and state governments.

Medical practitioners, however, suggest exercising some caution regarding the use of DRDO's anti-Covid drug 2-DG. The effect of the anti-viral drug on patients with comorbidities such as uncontrolled diabetes, severe cardiac problems, and even renal impairment, ARDS, etc. has not been studied yet. Moreover, the DRDO advises that the 2-DG be prescribed as early into the treatment cycle of moderate to severe Covid-19 patients as possible, for a maximum duration of up to 10 days.

https://www.hindustantimes.com/india-news/drdos-anti-covid-drug-2-dg-effective-against-all-covid-19-strains-reduces-cell-death-study-101623886946415.html

INDIA TODAY

Thu, 17 June 2021

DRDO's anti-Covid drug 2-DG found effective against all variants: Study

A new study claims that DRDO's anti-Covid drug 2-DG is effective against all variants of Covid-19. The drug reduces virus multiplication, according to the study

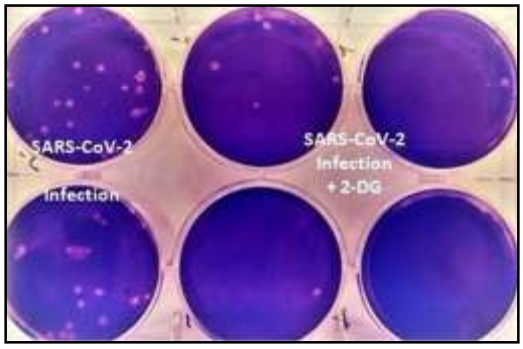
By Milan Sharma

New Delhi: A new study claims that DRDO's anti-Covid drug 2-DG is effective against all Covid-19 variants.

As per the study, 2-DG reduces the multiplication of SARS-CoV-2 and alleviates the cells from infection-induced cytopathic effect (CPE) and cell death. The study suggests that the drug can be used in the treatment regimen.

Based on these preliminary in-vitro findings, the molecule reached clinical trials in Covid patients.

The study, published on June 15, has not yet been peer-reviewed. It has been written by Anant Narayan Bhatt, Abhishek Kumar, Yogesh Rai, Dhiviya Vedagiri and others.



A new study claims that DRDO's anti-Covid drug 2-DG is effective against all variants of Covid-19. (Photo: India Today)

What you need to know about 2-DG

The drug, developed by the Defence Research and Development Organisation (DRDO) and Dr Reddy's Laboratories, received approval for emergency use in moderate to severe cases of Covid-19 in May.

Clinical trials of 2-DG found that it enables faster recovery of hospitalised Covid-19 patients and reduces their supplemental oxygen dependence. Dr. Reddy's Laboratories has launched 2-DG in the form of sachets.

The first batch of the oral drug was released on May 17.

Two weeks ago, DRDO issued directions on the usage of its 2-DG drug on Covid-19 patients, stating that caution should be exercised while prescribing this medicine to people who have comorbidities such as uncontrolled diabetes, severe cardiac problem and acute respiratory distress syndrome.

https://www.indiatoday.in/coronavirus-outbreak/story/drdo-covid-drug-2dg-effective-variants-study-1815698-2021-06-16

abp न्यूज़

Thu, 17 June 2021

नई रिसर्च में दावा- डीआरडीओ की 2-डीजी दवा कोरोना के सभी वैरिएंट कि खिलाफ कारगर

डीआरडीओ द्वारा विकसित anti-Covid drug 2-DG दवा कोरोना के सभी वैरिएंट के खिलाफ कारगर है। एक नई रिसर्च में इस बात का खुलासा हुआ है। अध्ययन के मुताबिक यह दवा SARS-CoV-2 की जटिलताओं को कम करती है और स्वस्थ्य कोशिकाओं को infection-induced cytopathic effect (CPE) से बचाती है। यानी यह कोशिकाओं को SARS-CoV-2 के संक्रमण होने पर हुए प्रभाव को कम करती है।

कोरोना के लिए DRDO ने anti-Covid drug 2-DG को विकसित किया है। DRDO का दावा है कि यह दवा कोरोना के सभी वैरिएंट के खिलाफ काफी कारगर है। अब एक नई रिसर्च में भी यह बात साबित हुई है कि 2-डीजी दवा कोरोना के सभी वैरिएंट के खिलाफ पुख्ता तरीके से काम करती है। अध्ययन के मुताबिक यह दवा SARS-CoV-2 की जटिलताओं को कम करती है और स्वस्थ्य कोशिकाओं को infection-induced cytopathic effect (CPE) से बचाती है।

यानी यह कोशिकाओं को SARS-CoV-2 के संक्रमण होने पर हुए प्रभाव को कम करती है। इसके साथ ही कोशिकाओं को मरने भी नहीं देती। यह अध्ययन 15 जून को प्रकाशित हुआ है। इस अध्ययन के लेखक हैं- अनंद नारायण भट्ट, अभिषेक कुमार, योगेश राय, दिव्या वेदागिरी एवं अन्य।

ट्रायल में अन्य वैरिएंट पर हुआ अध्ययन

हैदराबाद स्थित डॉ. रेड्डी लैब द्वारा 2डीजी पर चलाए गए क्लीनिकल ट्रायल के प्रमुख वैज्ञानिक रहे आइएनएमएस के डॉ अनंत नारायण भट्ट और डॉ. सुधीर चांदना ने देखा है कि तीसरे चरण के ट्रायल में यह दवा कई वैरिएंट्स पर प्रभावी है। डॉ. भट्ट ने बताया कि अब चाहे वायरस का कोई भी वैरिएंट हो उसे ग्लूकोज की जरूरत होगी, जिसे बाधित करने का काम यह दवा कर रही है। इसके साथ ही वायरस के विकास में प्रमुख भूमिका निभाने वाले अमीनो एसिड की भी आपूर्ति कोशिका में रूक जाती है जिससे उनकी संख्या नहीं बढ़ने पाती।

डीआरडीओ ने किया है विकसित

2-डीजी दवा के प्रभाव का विश्लेषण केवल दो अलग-अलग वैरिएंट (बी.6 और बी.1.1.7) पर किया गया था, लेकिन इसके एंटी-वायरल गुण कोरोना के सभी वैरिएंट पर असरदार साबित हुए। पिछले दिनों रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) और Dr Reddy's Laboratories ने मिलकर 2-डीजी दवा को विकसित किया है। मई में इस दवा के कोविड के गंभीर एवं मध्यम रोगियों में इस्तेमाल के लिए आपातकालीन मंजूरी ली गई है। 2-DG के क्लिनिकल ट्रायल में यह दावा किया गया है कि इससे रोगियों में ऑक्सीजन की निर्भरता घटेगी और अस्पताल में भर्ती रोगियों के जल्द ठीक होने में मदद देगी।

17 मई को बाजार में आ चुकी है दवा

17 मई को इस दवा की पहली खेप बाजार में आई थी। दो सप्ताह पहले डीआरडीओ ने एक गाइडलान जारी कर कहा था कि इस दवा को गंभीर दिल की बीमारी, अनियंत्रित डायबिटीज और सांस संबंधी दिक्कतों का सामना कर रहे मरीजों में देने से पहले सावधानी बरतनी चाहिए। इस दवा को डाक्टरों की देख-रेख और प्रेस्क्रिप्शन के तहत ही कोरोना मरीजों को दी जाने की सलाह दी गई है।

https://www.abplive.com/lifestyle/health/drdo-s-anti-covid-drug-2-dg-found-effective-against-all-variants-study-1928176

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Wed, 16 June 2021 1:15PM

Raksha Mantri calls for open & inclusive order in Indo-Pacific at the 8th ASEAN Defence Ministers Meeting Plus

Shri Rajnath Singh terms sea lanes of communication critical for peace & prosperity of the region

Raksha Mantri urges collective cooperation to fight terrorism

Raksha Mantri Shri Rajnath Singh called for an open and inclusive order in Indo-Pacific based upon respect for sovereignty and territorial integrity of nations while addressing the 8th ASEAN Defence Ministers Meeting (ADMM) Plus on June 16, 2021. The ADMM Plus is an annual meeting of Defence Ministers of 10 ASEAN (Association of Southeast Asian Nations) countries and eight dialogue partner countries - Australia, China, India, Japan, New Zealand, Republic of Korea, Russia and the United States. Brunei is the Chair of the ADMM Plus forum this year. Shri Rajnath Singh also stressed on "peaceful resolutions of disputes through dialogue and adherence to international rules and laws."

"India has strengthened its cooperative engagements in the Indo-Pacific based on converging visions and values for promotion of peace, stability and prosperity in the region. Premised upon the centrality of ASEAN, India supports utilisation of ASEAN-led mechanisms as important platforms for implementation of our shared vision for the Indo-Pacific," he added.

During thematic discussions on regional and international security environment, Shri Rajnath Singh put forth India's views before the Defence Ministers of ASEAN countries and eight dialogue partners. He stressed that the emerging challenges to international peace and security cannot be addressed with outdated systems designed to deal with trials of the past.

The Raksha Mantri reiterated India's support to freedom of navigation, over-flight and unimpeded commerce for all in international waters in accordance with the UN Convention on the Law of the Sea (UNCLOS). "Maritime security challenges are a concern to India. The Sea lanes of Communication are critical for peace, stability, prosperity and development of the Indo-Pacific region," he stressed. The Raksha Mantri hoped that the Code of Conduct negotiations will lead to outcomes keeping with international law and do not prejudice the legitimate rights and interests of nations that are not party to these discussions.

On the ‘Act East Policy’, announced by Prime Minister Shri Narender Modi in November 2014, Shri Rajnath Singh stated that the key elements of the policy aim to promote economic cooperation, cultural ties and develop strategic relationships with countries in the Indo-Pacific region through continuous engagement at bilateral, regional and multilateral levels.

Terming terrorism and radicalisation as gravest threats to world peace and security, Shri Rajnath Singh called for collective cooperation to fully disrupt terror organisations and their networks; identify the perpetrators and hold them accountable and ensure that strong measures are taken against those who support and finance terrorism and provide sanctuary to terrorists. As a member of the Financial Action Task Force (FATF), he said India remains committed to combat financing of terrorism.

To deal with cyber threats, the Raksha Mantri called for a multi-stakeholder approach, guided by democratic values, with a governance structure that is open and inclusive and a secure, open and stable internet with due respect to sovereignty of countries, that would drive the future of cyberspace.

On the most recent challenge faced by the world, COVID-19, Shri Rajnath Singh said the effect of the pandemic is still unfolding and the test, therefore, is to make sure that the world economy moves on the path of recovery and no one is left behind. This is only possible if entire humanity is vaccinated, he stated. “Globally available patent free vaccines, unhindered supply chains and greater global medical capacities are some of the lines of effort that India has suggested for a combined effort,” he highlighted.

Referring to the Humanitarian Assistance and Disaster Relief (HADR) operations, the Raksha Mantri stated that India remains one of the first to respond in times of distress in the immediate as well as extended neighbourhood. As a founding member of the Heads of Asian Coast Guard Agencies Meeting (HACGAM), India seeks to enhance capacity building through collaboration in the areas of Maritime Search & Rescue, he added.

Shri Rajnath Singh also underscored the importance India attaches to ASEAN centrality and unity in ensuring peace and stability in the region. He said India shares a deep connect with ASEAN and has continued its active engagement in many areas contributing to regional peace and stability, particularly through ASEAN led mechanisms, such as East Asia Summit, ASEAN Regional Forum and ADMM-Plus. The India-ASEAN strategic partnership has been strengthened by virtue of flourishing cultural and civilisational links and enhanced people-to-people cooperation, he added. The Raksha Mantri thanked Brunei for conducting the ADMM Plus despite the restrictions imposed by COVID-19.

Defence Secretary Dr Ajay Kumar and Chief of Integrated Defence Staff to the Chairman Chiefs of Staff Committee (CISC) Vice Admiral Atul Kumar Jain and other senior officials of Ministry of Defence and Ministry of External Affairs attended the meeting.

https://pib.gov.in/PressReleasePage.aspx?PRID=1727467

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 16 June 2021 1:15PM

रक्षा मंत्री ने 8वीं आसियान डिफेंस मिनिस्टर्स मीटिंग-प्लस की बैठक में हिंद-प्रशांत क्षेत्र में खुली और समावेशी व्यवस्था का आह्वान किया

श्री राजनाथ सिंह ने संचार के समुद्री गलियारों को क्षेत्र की शांति और समृद्धि के लिए महत्वपूर्ण बताया

रक्षा मंत्री ने आतंकवाद से लड़ने के लिए सामूहिक सहयोग का आग्रह किया

रक्षा मंत्री श्री राजनाथ सिंह ने 16 जून, 2021 को आठवीं आसियान रक्षा मंत्रियों की बैठक (एडीएमएम) प्लस को संबोधित करते हुए राष्ट्रों की संप्रभुता और क्षेत्रीय अखंडता के सम्मान के आधार पर हिंद-प्रशांत क्षेत्र में एक खुली और समावेशी व्यवस्था का आह्वान किया। एडीएमएम प्लस 10 आसियान (दक्षिण पूर्व एशियाई देशों के संघ) देशों और उसके आठ वार्ता सहयोगियों - ऑस्ट्रेलिया, चीन, भारत, जापान, न्यूजीलैंड, कोरिया गणराज्य, रूस और अमेरिका के रक्षा मंत्रियों की वार्षिक बैठक है। ब्रुनेई इस वर्ष एडीएमएम प्लस फोरम की अध्यक्षता कर रहा है। श्री राजनाथ सिंह ने बातचीत के जरिए विवादों के शांतिपूर्ण समाधान और अंतरराष्ट्रीय नियमों और कानूनों का पालन करने पर भी जोर दिया।

उन्होंने कहा कि "भारत ने क्षेत्र में शांति, स्थिरता और समृद्धि के प्रचार के लिए बदलते दृष्टिकोणों और मूल्यों के आधार पर हिंद-प्रशांत में सहयोगी भागीदारी मजबूत की है। आसियान की केंद्रीयता के आधार पर भारत ने हिंद-प्रशांत के लिए हमारे साझा दृष्टिकोण के क्रियान्वयन के वास्ते महत्वपूर्ण मंच के तौर पर आसियान के नेतृत्व वाले तंत्रों के इस्तेमाल का समर्थन किया है।''

क्षेत्रीय और अंतर्राष्ट्रीय सुरक्षा माहौल पर विषयगत विचार-विमर्श के दौरान श्री राजनाथ सिंह ने आसियान देशों के रक्षा मंत्रियों और आठ संवाद साझेदार देशों के समक्ष भारत के विचार रखे। उन्होंने जोर देकर कहा कि अंतरराष्ट्रीय शांति और सुरक्षा के लिए उभरती चुनौतियों का समाधान अतीत में पैदा होने वाली स्थितियों से निपटने के लिए तैयार की गई पुरानी प्रणालियों से नहीं किया जा सकता।

रक्षा मंत्री ने संयुक्त राष्ट्र कन्वेंशन ऑन द लॉ ऑफ द सी (यूएनसीएलओएस) के अनुसार अंतरराष्ट्रीय जल क्षेत्र में सभी के लिए नौवहन की स्वतंत्रता, समुद्री क्षेत्र में उड़ान और बेरोकटोक व्यापार की आजादी सुनिश्चित करने की जरूरत पर जोर दिया। समुद्री सुरक्षा संबंधी चुनौतियां भारत के लिए चिंता का विषय हैं। उन्होंने जोर देकर कहा कि हिंद-प्रशांत क्षेत्र की शांति, स्थिरता, समृद्धि और विकास के लिए संचार के समुद्री क्षेत्र महत्वपूर्ण हैं। रक्षा मंत्री ने आशा व्यक्त की कि कोड ऑफ कंडक्ट वार्ता से अंतर्राष्ट्रीय कानून को ध्यान में रखते हुए परिणाम सामने आएंगे और उन राष्ट्रों के वैध अधिकारों और हितों पर प्रतिकूल प्रभाव नहीं पड़ेगा जो इन चर्चाओं के पक्षधर नहीं हैं।

नवंबर 2014 में प्रधानमंत्री श्री नरेन्द्र मोदी द्वारा घोषित 'एक्ट ईस्ट पॉलिसी' पर श्री राजनाथ सिंह ने कहा कि इस नीति के प्रमुख तत्वों का उद्देश्य आर्थिक सहयोग, सांस्कृतिक संबंधों को बढ़ावा देना और द्विपक्षीय, क्षेत्रीय और बहुपक्षीय स्तरों पर निरंतर जुड़ाव के माध्यम से हिंद-प्रशांत क्षेत्र के देशों के साथ रणनीतिक संबंध विकसित करना है।

आतंकवाद और कट्टरता को विश्व शांति और सुरक्षा के लिए गंभीर खतरा बताते हुए श्री राजनाथ सिंह ने आतंकी संगठनों और उनके नेटवर्क को पूरी तरह ध्वस्त करने के लिए सामूहिक सहयोग का आह्वान किया। सामूहिक सहयोग अपराधियों की पहचान करने और उन्हें जवाबदेह ठहराने और यह सुनिश्चित करने कि आतंकवाद का समर्थन करने और वित्तपोषण करने वालों, आतंकवादियों को आश्रय प्रदान करने वालों के खिलाफ मजबूत कदम उठाए जाएं। उन्होंने कहा कि वित्तीय कार्रवाई कार्य बल (एफएटीएफ) के सदस्य के तौर पर भारत वित्तीय आतंकवाद से लड़ने के लिए प्रतिबद्ध है।

साइबर खतरों से निपटने के लिए रक्षा मंत्री ने लोकतांत्रिक मूल्यों द्वारा निर्देशित बहु-हितधारक दृष्टिकोण का आह्वान किया, जिसमें एक शासन ढांचा हो जो खुला और समावेशी हो तथा देशों की संप्रभुता का सम्मान करते हुए एक सुरक्षित, खुले और स्थिर इंटरनेट वाला हो, यही साइबर स्पेस के भविष्य का संचालन करेगा ।

दुनिया के सामने सबसे हालिया चुनौती कोविड-19 के बारे में श्री राजनाथ सिंह ने कहा कि महामारी का प्रभाव अभी भी सामने आ रहा है और इसलिए चुनौती यह है कि विश्व अर्थव्यवस्था सुधार की राह पर बढ़े और यह सुनिश्चित हो कि इसमें कोई भी पीछे न छूटे। उन्होंने कहा कि यह तभी संभव है जब पूरे मानव समुदाय को टीका लगाया जाए। उन्होंने इस बात पर प्रकाश डाला कि विश्व स्तर पर पेटेंट मुक्त टीके उपलब्ध कराने, निर्बाध आपूर्ति श्रृंखलाएं और अधिक वैश्विक चिकित्सा क्षमताएं कुछ ऐसे प्रयास हैं जिनका सुझाव भारत ने संयुक्त प्रयास के तौर पर दिया है।

मानवीय सहायता और आपदा राहत (एचएडीआर) अभियानों का जिक्र करते हुए रक्षा मंत्री ने कहा कि भारत अपने करीबी तथा दूर स्थित पड़ोसी देशों में संकट के समय सबसे पहले सहायता देने वाले देशों में से एक है। उन्होंने कहा कि हेड्स ऑफ एशियन कोस्टगार्ड एजेंसीज़ मीटिंग (एचएसीजीएएम) के संस्थापक सदस्य के रूप में भारत समुद्री खोज और बचाव के क्षेत्रों में सहयोग के माध्यम से क्षमता निर्माण को बढ़ाना चाहता है।

श्री राजनाथ सिंह ने क्षेत्र में शांति और स्थिरता सुनिश्चित करने के लिए आसियान केंद्रीयता और एकता को भारत द्वारा दिए जाने वाले महत्व को भी रेखांकित किया। उन्होंने कहा कि भारत आसियान के साथ गहरा जुड़ाव रखता है और उसने, विशेष रूप से आसियान के नेतृत्व वाले तंत्रों जैसे पूर्वी एशिया शिखर सम्मेलन, आसियान क्षेत्रीय मंच और एडीएमएम-प्लस के माध्यम से, क्षेत्रीय शांति और स्थिरता में योगदान देने वाले कई क्षेत्रों में अपने सक्रिय संबंध जारी रखे हैं। उन्होंने कहा कि भारत-आसियान रणनीतिक साझेदारी को समृद्ध सांस्कृतिक और सभ्यतागत संबंधों और लोगों के बीच सहयोग बढ़ाने के आधार पर मजबूत किया गया है। रक्षा मंत्री ने कोविड-19 प्रतिबंधों के बावजूद एडीएमएम प्लस के आयोजन के लिए ब्रुनेई को धन्यवाद दिया।

रक्षा सचिव डॉ. अजय कुमार और चीफ ऑफ इंटीग्रेटेड डिफेंस स्टाफ टू द चेयरमैन चीफ्स ऑफ स्टाफ कमिटी (सीआईएससी) वाइस एडमिरल अतुल कुमार जैन और रक्षा मंत्रालय और विदेश मंत्रालय के अन्य वरिष्ठ अधिकारी बैठक में शामिल हुए।

https://pib.gov.in/PressReleasePage.aspx?PRID=1727723

THE HINDU

Thu, 17 June 2021

IAF Chief to review CGP on Saturday

Hyderabad: Chief of Air Staff, Air Chief Marshal R.K.S. Bhadauria, PVSM, AVSM, VM, ADC will be the chief guest and reviewing officer of the Combined Graduation Parade (CGP) to be held at Air Force Academy (AFA) Dundigal, on June 19 to mark the successful completion of pre-commissioning training of flight cadets of various branches of Indian Air Force (IAF).

During the function, he will confer the 'President's Commission' to the graduating trainees. The ceremony includes presentation of 'wings' and 'brevets' to the flight cadets who would be successfully completing flying and navigation training, respectively. The IAF chief will also be awarding 'wings' to officers of Indian Navy and Indian Coast Guard on successful completion of their flying training at AFA.

The Combined Graduation Parade will be held at Air Force Academy, Dundigal. | Photo Credit: neel385@yahoo.com

The event will also have an aerobatic display by the famous Surya Kiran Aerobatic Team, Sarang Helicopter Display Team, Pilatus PC-7 trainer and Para jumping by the Akash Ganga Team. The ceremony will also have fly past formations by Hawk, Kiran, Pilatus aircraft and Chetak helicopters.

Due to the COVID-19 situation, parents of graduating flight cadets have not been invited to witness the CGP this time. However, AFA is making adequate arrangements for live streaming of the entire CGP activities on Doordarshan channel, social media and coverage in print and electronic media, said a press release.

https://www.thehindu.com/news/cities/Hyderabad/iaf-chief-to-review-cgp-on-saturday/article34833671.ece

THE TIMES OF INDIA

Thu, 17 June 2021

Cabinet approves Deep Ocean Mission to tap vast marine living and non-living resources

By Vishwa Mohan

New Delhi: The Centre on Wednesday approved the Deep Ocean Mission to tap vast marine living and non-living resources, develop deep-sea technologies for sustainable use of ocean resources, conduct research on climate variables and support the country's Blue Economy initiatives including marine fisheries, off-shore energy and coastal tourism.

The Mission will help India to explore and mine strategic polymetallic nodules such as Copper, Nickel, Cobalt and Manganese in 75,000 sq. km of area in the central Indian Ocean Basin, and put the country in the category of a select group of nations, including the US, China, Japan, Germany and Canada, in conducting oceanographic research in the deep sea.

The Mission has been allocated Rs 4,077 crore for a period of five years. It'll be implemented in a phased manner by the ministry of earth sciences (MoES) through multiple institutions such as ISRO, BARC, CSIR, DRDO, Department of biotechnology and others. The estimated cost for the first phase of the Mission for the three years (2021-2024) will be Rs 2,823 crore.

"It is an important decision to support the country's Blue Economy. The main features of the Mission include conducting mineral study 6000 meters deep in the sea, deep-sea survey, research on climate change variables and its impact, and study of marine biodiversity," said environment minister Prakash Javadekar.

The Mission, announced in the Union Budget for 2021-22, was approved on Wednesday by the Cabinet Committee on Economic Affairs (CCEA), chaired by Prime Minister Narendra Modi.

The Mission consists of six major components including the development of technologies for deep-sea mining and manned submersible; development of ocean climate change advisory services; technological innovations for exploration and conservation of deep-sea biodiversity; deep ocean survey and exploration; off-shore energy and fresh water from the ocean; and advanced marine station for ocean biology.

A manned submersible under the Mission will be developed to carry three people to a depth of 6000 metres in the ocean with a suite of scientific sensors and tools. "Only a very few countries have acquired this capability. An Integrated Mining System will be also developed for mining Polymetallic Nodules from 6000 metres depth in the central Indian Ocean," said a statement on the Cabinet's decision.

It said, "The exploration studies of minerals will pave the way for commercial exploitation in the near future, as and when commercial exploitation code is evolved by the International Seabed Authority, a UN organization. This component will help the Blue Economy priority area of exploring and harnessing deep-sea minerals and energy."

Under the development of ocean climate change advisory services, a suite of observations and models will be developed to understand and provide future projections of important climate variables on seasonal to decadal time scales. This component will support the Blue Economy priority area of coastal tourism.

"The technologies required for deep-sea mining have strategic implications and are not commercially available. Hence, attempts will be made to indigenise technologies by collaborating with leading institutes and private industries. A research vessel for deep ocean exploration would be built in an Indian shipyard which would create employment opportunities," said the statement.

https://timesofindia.indiatimes.com/india/cabinet-approves-deep-ocean-mission-to-tap-vast-marine-living-and-non-living-resources/articleshow/83572525.cms

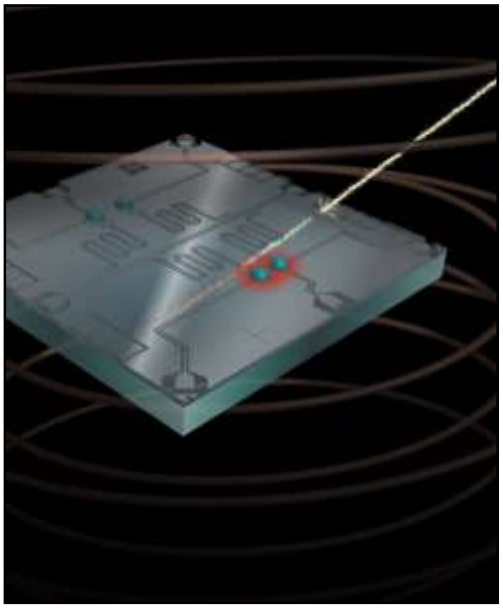
PHYS.ORG

Thu, 17 June 2021

Correlated errors in quantum computers emphasize need for design changes

Quantum computers could outperform classical computers at many tasks, but only if the errors that are an inevitable part of computational tasks are isolated rather than widespread events. Now, researchers at the University of Wisconsin-Madison have found evidence that errors are correlated across an entire superconducting quantum computing chip—highlighting a problem that must be acknowledged and addressed in the quest for fault-tolerant quantum computers.

The researchers report their findings in a study published June 16 in the journal *Nature*, Importantly, their work also points to mitigation strategies.



In this artistic rendering, a high-energy cosmic ray hits the qubit chip, freeing up charge in the chip substrate that disrupts the state of neighboring qubits. Credit: Robert McDermott

"I think people have been approaching the problem of error correction in an overly optimistic way, blindly making the assumption that errors are not correlated," says UW-Madison physics Professor Robert McDermott, senior author of the study. "Our experiments show absolutely that errors are correlated, but as we identify problems and develop a deep physical understanding, we're going to find ways to work around them."

The bits in a classical computer can either be a 1 or a 0, but the qubits in a quantum computer can be 1, 0, or an arbitrary mixture—a superposition—of 1 and 0. Classical bits, then, can only make bit flip errors, such as when a 1 flips to 0. Qubits, however, can make two types of error: bit flips or phase flips, where a quantum superposition state changes.

To fix errors, computers must monitor them as they happen. But the laws of quantum physics say that only one error type can be monitored at a time in a single qubit, so a clever error correction protocol called the surface code has been proposed. The surface code involves a large array of connected qubits—some do the computational work, while others are monitored to infer errors in the computational qubits. However, the surface code protocol works reliably only if events that cause errors are isolated, affecting at most a few qubits.

In earlier experiments, McDermott's group had seen hints that something was causing multiple qubits to flip at the same time. In this new study, they directly asked: are these flips independent, or are they correlated?

The research team designed a chip with four qubits made of the superconducting elements niobium and aluminum. The scientists cool the chip to nearly absolute zero, which makes it superconduct and protects it from error-causing interference from the outside environment.

To assess whether qubit flips were correlated, the researchers measured fluctuations in offset charge for all four qubits. The fluctuating offset charge is effectively a change in electric field at the qubit.

The team observed long periods of relative stability followed by sudden jumps in offset charge. The closer two qubits were together, the more likely they were to jump at the same time. These sudden changes were most likely caused by cosmic rays or background radiation in the lab, which both release charged particles. When one of these particles hits the chip, it frees up charges that affect nearby qubits.

This local effect can be easily mitigated with simple design changes. The bigger concern is what could happen next.

"If our model about particle impacts is correct, then we would expect that most of the energy is converted into vibrations in the chip that propagate over long distances," says Chris Wilen, a graduate student and lead author of the study. "As the energy spreads, the disturbance would lead to qubit flips that are correlated across the entire chip."

In their next set of experiments, that effect is exactly what they saw. They measured charge jumps in one qubit, as in the earlier experiments, then used the timing of these jumps to align measurements of the quantum states of two other qubits. Those two qubits should always be in the computational 1 state. Yet the researchers found that any time they saw a charge jump in the first qubit, the other two—no matter how far away on the chip—quickly flipped from the computational 1 state to the 0 state.

"It's a long-range effect, and it's really damaging," Wilen says. "It's destroying the quantum information stored in qubits."

Though this work could be viewed as a setback in the development of superconducting quantum computers, the researchers believe that their results will guide new research toward this problem. Groups at UW-Madison are already working on mitigation strategies.

"As we get closer to the ultimate goal of a fault-tolerant quantum computer, we're going to identify one new problem after another," McDermott says. "This is just part of the process of learning more about the system, providing a path to implementation of more resilient designs."

More information: Correlated charge noise and relaxation errors in superconducting qubits, *Nature* (2021). DOI: 10.1038/s41586-021-03557-5 , www.nature.com/articles/s41586-021-03557-5

Journal information: *Nature*

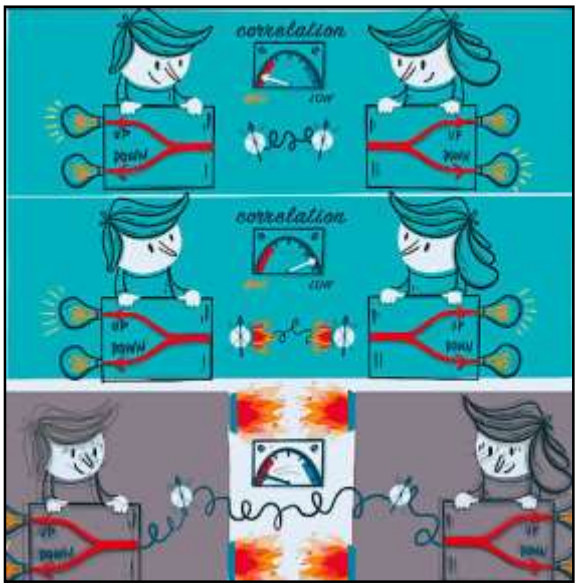
https://phys.org/news/2021-06-errors-quantum-emphasize.html

PHYS.ORG

Thu, 17 June 2021

Quantum-nonlocality at all speeds

The phenomenon of quantum nonlocality defies our everyday intuition. It shows the strong correlations between several quantum particles some of which change their state instantaneously when the others are measured, regardless of the distance between them. While this phenomenon has been confirmed for slow moving particles, it has been debated whether nonlocality is preserved when particles move very fast at velocities close to the speed of light, and even more so when those velocities are quantum mechanically indefinite. Now, researchers from the University of Vienna, the Austrian Academy of Sciences and the Perimeter Institute report in the latest issue of *Physical Review Letters* that nonlocality is a universal property of the world, regardless of how and at what speed quantum particles move.



The new result proves that it is possible to design a Bell experiment for particles moving in a quantum superposition at very high speeds. Credit: ALOOP; ÖAW

It is easy to illustrate how correlations can arise in everyday life. Imagine that each day of the month you send two of your friends, Alice and Bob, a toy engine of a set of two for their collection. You can choose each of the engines to be either red or blue or either electric or steam. Your friends are separated by a large distance and do not know about your choice. Once their parcels arrive, they can check the color of their engine with a device that can distinguish between red and blue or check whether the engine is electric or steam using another device. They compare the measurements made over time to look for particular correlations. In our everyday world, such correlations obey two principles—"realism" and "locality." "Realism" means that Alice and Bob reveal only what color or the mechanism of the engine you had chosen in the past, and "locality" means that Alice's measurement cannot change the color or the mechanism of Bob's engine (or vice versa). Bell's theorem, published in 1964 and considered by some to be one of the most profound discoveries in the foundations of physics, showed that correlations in the quantum world are incompatible with the two principles—a phenomenon known as quantum non-locality.

Quantum nonlocality has been confirmed in numerous experiments, the so-called Bell tests, on atoms, ions and electrons. It not only has deep philosophical implications, but also underpins many of the applications such as quantum computation and quantum satellite communications. However, in all of these experiments, the particles were either at rest or moving at low velocities (scientists call this regime "non-relativistic"). One of the unsolved problems in this field, which still puzzles physicists, is whether nonlocality is preserved when particles are moving extremely fast, close to the speed of light (i.e., in the relativistic regime), or when they are not even moving at a well-defined speed.

For two quantum particles in a Bell's test, which move at high speeds, researchers predict that the correlations between the particles are, in principle, reduced. However, if Alice and Bob adapt their measurements in a way that depends on the speed of the particles the correlations between the results of their measurements are still nonlocal. Now, imagine that not only are the particles moving very fast, but their velocity is also indefinite: each particle moves in a so-called superposition of different velocities simultaneously, just as the infamous Schrödinger's cat is simultaneously dead and alive. In such a case, is their description of the world still non-local?

Researchers, led by Časlav Brukner at the University of Vienna and the Austrian Academy of Sciences, have shown that Alice and Bob can indeed design an experiment which would prove that the world is nonlocal. For this, they used one of the most fundamental principles of physics namely that physical phenomena do not depend on the frame of reference from which we observe them. For example, according to this principle, any observer, whether moving or not, will see that an apple falling from a tree will touch the ground. The researchers went a step further and extended this principle to reference frames "attached" to quantum particles. These are called "quantum reference frames." The key insight is that if Alice and Bob could move with the quantum reference frames along with their respective particles, they could perform the usual Bell test, since for them the particles would be at rest. In this way, they can prove quantum nonlocality for any quantum particle, regardless of whether the velocity is indefinite or close to that of light.

Flaminia Giacomini, one of the study's authors, says, "Our result proves that it is possible to design a Bell experiment for particles moving in a quantum superposition at very high speeds." The co-author, Lucas Streiter, concludes, "We have shown that nonlocality is a universal property of our world." Their discovery is expected to open applications in quantum technologies, such as quantum satellite communications and quantum computation, using relativistic particles.

More information: Lucas F. Streiter et al, Relativistic Bell Test within Quantum Reference Frames, *Physical Review Letters* (2021). DOI: 10.1103/PhysRevLett.126.230403

Journal information: *Physical Review Letters*

https://phys.org/news/2021-06-quantum-nonlocality.html

PHYS.ORG

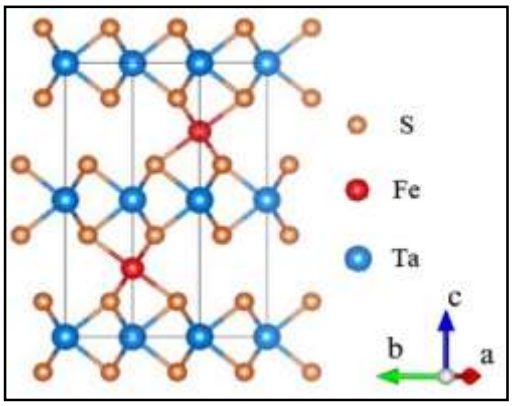
Thu, 17 June 2021

Inducing and tuning spin interactions in layered material by inserting iron atoms, protons

Magnetic-spin interactions that allow spin-manipulation by electrical control allow potential applications in energy-efficient spintronic devices.

An antisymmetric exchange known as Dzyaloshinskii-Moriya interactions (DMI) is vital to form various chiral spin textures, such as skyrmions, and permits their potential application in energy-efficient spintronic devices.

Published this week, a Chinese-Australia collaboration has for the first time illustrated that DMI can be induced in a layered material tantalum-sulfide (TaS_2) by intercalating iron atoms, and can further be tuned by gate-induced proton intercalation.



Crystal structure, showing iron atoms (red) in tantalum-sulfide structure. Credit: FLEET

Searching for layered materials that harbor chiral spin textures, such as skyrmions, chiral domain Walls is vital for further low-energy nanodevices, as those chiral spin textures are building blocks for topological spintronic devices and can be driven by ultra-low current density.

Generally, chiral spin textures are stabilized by DMI. Therefore, introducing and controlling DMI in materials is key in searching and manipulating the chiral spin textures.

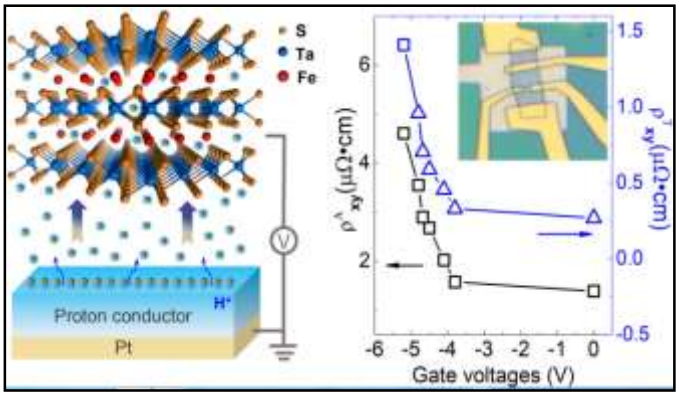
"Tantalum-sulfide is one of the large family of transition metal dichalcogenide (TMDCs) investigated by FLEET for low-energy applications," says the study's first author, FLEET Research Fellow Dr. Guolin Zheng (RMIT).

The team firstly successfully realized a sizable DMI in the layered material tantalum-sulfide (TaS_2) by intercalating Fe atoms.

However, electrically controlling the DMI turns out to be challenging:

"Both conventional electric-field gating, and the widely-used alternative technique of ion-liquid (Li^+) gating have hit stumbling blocks in the electrical control of DMI in itinerant ferromagnets, because the electric-field and Li^+ can only modulate the carriers close to the surface," explains Guolin.

To address this limitation in tuning the DMI, the group at RMIT recently developed a new protonic gate technique, and successfully illustrated that DMI can be dramatically controlled by gate-induced proton intercalations.



Credit: FLEET

By increasing the intercalation of protons by gate voltage, the team were able to significantly change the carrier density and further tune the DMI via the Ruderman-Kittel-Kasuya-Yosida (RKKY) mechanism, which refers to the coupling of nuclear magnetic moments.

"The observed topological Hall resistivity after proton intercalation has been increased more than four-fold under a few volts, indicating a huge increase of DMI," says co-author A/Prof Lan Wang (also at RMIT).

"The successful tuning of DMI in chiral magnet Fe-intercalated TaS_2 by protonic gate enables an electrical control of the chiral spin textures as well as the potential applications in energy-efficient spintronic devices," says co-author Prof Mingliang Tian, who is a FLEET Partner Investigator and Director of the Center's partner organization the High Magnetic Field Laboratory (Anhui Province, China).

"Tailoring Dzyaloshinskii-Moriya interaction in a transition metal dichalcogenide by dual-intercalation" was published in *Nature Communications* in June 2021.

More information: Guolin Zheng et al, Tailoring Dzyaloshinskii–Moriya interaction in a transition metal dichalcogenide by dual-intercalation, *Nature Communications* (2021). DOI: 10.1038/s41467-021-23658-z

Journal information: *Nature Communications*

https://phys.org/news/2021-06-tuning-interactions-layered-material-inserting.html

THE HINDU BusinessLine

Thu, 17 June 2021

Exposure to common cold virus may protect from Covid-19: Study

Research has found that rhinovirus, the common respiratory virus, jump-starts the activity of interferon-stimulated genes

Washington: Exposure to the virus that causes common cold can provide protection against infection by the SARS-CoV-2 virus behind Covid-19, according to a study.

The research, published on Tuesday in the Journal of Experimental Medicine, found that rhinovirus, the common respiratory virus, jump-starts the activity of interferon-stimulated genes.

These genes trigger early-response molecules in the immune system which can stop reproduction of the SARS-CoV-2, the virus that causes Covid-19, within airway tissues infected with the cold, the researchers said.

Triggering these defences early in the course of Covid-19 infection holds promise to prevent or treat the infection, said senior study author, Ellen Foxman, assistant professor at the Yale School of Medicine in the US.

One way to do this, Foxman said, is by treating patients with interferons, an immune system protein which is also available as a drug. “But it all depends upon the timing,” she said.

Previous work showed that at the later stages of Covid-19, high interferon levels are associated with worse disease outcomes, and may fuel overactive immune responses.

However, recent genetic studies show that interferon-stimulated genes can also be protective in cases of Covid-19 infection. The researchers wanted to study this defence system early in the course of Covid-19 infection. They decided to study whether rhinoviruses would have beneficial impact against the SARS-CoV-2 virus.

The team infected lab-grown human airway tissue with the virus and found that for the first three days, viral load in the tissue doubled about every six hours. However, the researchers found that reproduction of the Covid-19 virus was completely stopped in tissue which had been exposed to rhinovirus.

If antiviral defences were blocked, the SARS-CoV-2 could reproduce in airway tissue previously exposed to rhinovirus. The same defences slowed down SARS-CoV-2 infection even without rhinovirus, but only if the infectious dose was low.

This suggests that the viral load at the time of exposure makes a difference in whether the body can effectively fight the infection, the researchers noted. The team of researchers also studied nasal swab samples from patients diagnosed close to the start of infection.

They found evidence of rapid growth of SARS-CoV-2 in the first few days of infection, followed by activation of the body’s defences. According to their findings, the virus typically increased rapidly for the first few days of infection, before host defences kicked in, doubling about every six hours as seen in the lab.

In some patients the virus grew even faster, the researchers found. “There appears to be a viral sweet spot at the beginning of Covid-19, during which the virus replicates exponentially before it triggers a strong defence response,” Foxman said.

She explained that interferon treatment holds promise but it could be tricky, because it would be mostly effective in the days immediately after infection, when many people exhibit no symptoms.

In theory, interferon treatment could be used as a preventive in people at high risk who have been in close contact with others diagnosed with Covid-19, they said. Trials of interferon in Covid-19 are underway, and so far show a possible benefit early in infection, but not when given later.

These findings may help explain why at times of year when colds are common, rates of infections with other viruses such as influenza tend to be lower, Foxman added.

https://www.thehindubusinessline.com/news/science/exposure-to-common-cold-virus-may-protect-from-covid-19-study/article34828788.ece