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Air version of BrahMos supersonic cruise missile successfully test-fired from Sukhoi 30 MK-I off Odisha coast

Raksha Mantri Shri Rajnath Singh lauds DRDO, BrahMos, Indian Air Force &Industry on successful test firing

Air version of BrahMos supersonic cruise missile was successfully test fired from the supersonic fighter aircraft Sukhoi 30 MK-I at 1030 hrs from Integrated Test Range, Chandipur off the coast of Odisha on December 08, 2021. In this copy book flight, the missile launched from the aircraft followed the pre-planned trajectory meeting all mission objectives.

The launch is a major milestone in the BrahMos development. It clears the system for the serial production of air-version BrahMos missiles within the country. Major airframe assemblies which form the integral part of the Ramjet Engine are indigenously developed by Indian Industry. These include metallic and non-metallic air frame sections comprising Ramjet fuel tank and pneumatic fuel supply system. During the test, the structural integrity and functional performance have been proven. The air version of BrahMos was last flight tested in July 2021.

Raksha Mantri Shri Rajnath Singh has praised Defence Research and Development Organisation (DRDO), BrahMos, Indian Air Force and the industry on the successful test firing.Congratulating the teams involved in the flight test, Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy said various laboratories of DRDO, academic institutions, quality assurance & certification agencies, Public Sector undertakings and Indian Air Force participated in the development, testing, production and induction of this complex missile system.

BrahMos is a Joint Venture between India (DRDO) and Russia (NPOM) for the development, production and marketing of the supersonic cruise missile. BrahMos is the potent offensive missile weapon system already inducted into the Armed Forces.

https://pib.gov.in/PressReleasePage.aspx?PRID=1779134

पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 08 Dec 2021 12:13PM

ब्रह्मोस सुपरसोनिक क्रूज मिसाइल के वायु संस्करण का ओडिशा तट से दूर सुखोई 30 एमके-I से सफलतापूर्वक परीक्षण किया गया

रक्षा मंत्री श्री राजनाथ सिंह ने सफलतापूर्वक की गई टेस्ट फायरिंग पर डीआरडीओ, ब्रह्मोस, भारतीय वायु सेना और उद्योग की प्रशंसा की

ब्रह्मोस सुपरसोनिक क्रूज मिसाइल के वायु संस्करण का आज (08 दिसम्बर, 2021) ओडिशा के तट से दूर एकीकृत परीक्षण रेंज, चांदीपुर से प्रात: 10:30 बजे सुपरसोनिक लड़ाकू विमान सुखोई 30 एमके -I से सफलतापूर्वक परीक्षण किया गया। इस उल्लेखनीय उड़ान में विमान से लॉन्च की गई मिसाइल ने सभी मिशन उद्देश्यों को पूरा करने के लिए पूर्व नियोजित गति प्रक्षेप पथ (ट्रजेक्टरी) का पालन किया।

यह लॉन्च ब्रह्मोस के विकास में एक प्रमुख उपलब्धि है। यह देश में वायु संस्करण ब्रह्मोस मिसाइलों के क्रमबद्ध उत्पादन की प्रणाली को उजागर करता है। रामजेट इंजन का मुख्य भाग स्थापित करने वाली प्रमुख एयरफ्रेम असेंबलियां भारतीय उद्योग द्वारा स्वेदशी रूप से विकसित की गई हैं। इन असेंबलियों में रामजेट ईंधन टैंक और वायु चालित (न्यूमैटिक) ईंधन आपूर्ति प्रणाली सहित गैर-धात्विक वायु फ्रेम सेक्शन शामिल हैं। परीक्षण के दौरान, संरचनात्मक अखंडता और कार्यात्मक प्रदर्शन प्रमाणित हुए हैं। ब्रह्मोस के वायु संस्करण का पिछला परीक्षण जुलाई 2021 में किया गया था।

रक्षा मंत्री श्री राजनाथ सिंह ने सफल परीक्षण फायरिंग पर रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ), ब्रह्मोस, भारतीय वायु सेना और उद्योग की प्रशंसा की है। उड़ान परीक्षण में शामिल टीमों को बधाई देते हुए रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी. सतीश रेड्डी ने कहा कि डीआरडीओ की विभिन्न प्रयोगशालाओं, शैक्षणिक संस्थानों, गुणवत्ता आश्वासन और प्रमाणीकरण एजेंसियों, सार्वजनिक क्षेत्र के उपक्रमों और भारतीय वायु सेना ने इस जटिल मिसाइल प्रणाली के विकास, परीक्षण, उत्पादन और समावेशन में भाग लिया है।

ब्रह्मोस सुपरसोनिक क्रूज मिसाइल के विकास, उत्पादन और विपणन के लिए भारत (डीआरडीओ) और रूस (एनपीओएम) के बीच एक संयुक्त उद्यम है। ब्रह्मोस एक शक्तिशाली आक्रामक मिसाइल हथियार प्रणाली है जिसे पहले ही सशस्त्र बलों में शामिल किया जा चुका है।

https://pib.gov.in/PressReleasePage.aspx?PRID=1779205

Press Information Bureau
Government of India

రక్షణ మంత్రిత్వ శాఖ

Wed, 08 Dec 2021 12:13PM

ఒడిశా తీరంలో విజయవంతంగా పరీక్షించబడిన బ్రహ్మోస్ సూపర్ సోనిక్ క్రూయిజ్ క్షిపణి యొక్క ఎయిర్ వెర్షన్ సుఖోయ్ 30 MK-I

రక్షణ మంత్రి శ్రీ రాజ్‌నాథ్ సింగ్ DRDO, బ్రహ్మోస్, భారత వైమానిక దళం & పరిశ్రమలను విజయవంతంగా టెస్ట్ ఫైరింగ్‌పై ప్రశంసించారు

బ్రహ్మోస్ సూపర్‌సోనిక్ క్రూయిజ్ క్షిపణి యొక్క ఎయిర్ వెర్షన్ సూపర్‌సోనిక్ ఫైటర్ ఎయిర్‌క్రాఫ్ట్ సుఖోయ్ 30 MK-I డిసెంబర్ 08, 2021న ఒడిశా తీరంలోని చండీపూర్‌లోని ఇంటిగ్రేటెడ్ టెస్ట్ రేంజ్ నుండి 10.30 గంటలకు విజయవంతంగా పరీక్షించబడింది. ఈ కాపీ బుక్ ఫ్లైట్‌లో, క్షిపణిని ప్రయోగించారు. విమానం ముందుగా అనుకున్న పథాన్ని అనుసరించి అన్ని మిషన్ లక్ష్యాలను చేరుకుంది.

బ్రహ్మోస్ అభివృద్ధిలో ఈ ప్రయోగం ఒక ప్రధాన మైలురాయిగా నిలువనుంది. ఇది దేశంలో గాలి-వెర్షన్ బ్రహ్మోస్ క్షిపణుల వరుస ఉత్పత్తి వ్యవస్థను క్లియర్ చేస్తుంది. రామ్‌జెట్ ఇంజిన్‌లో అంతర్భాగంగా ఉండే ప్రధాన ఎయిర్ ఫ్రేమ్ దేశీయంగా భారతీయ పరిశ్రమచే అభివృద్ధి చేయబడ్డాయి. వీటిలో రామ్‌జెట్ ఇంధన ట్యాంక్ మరియు వాయు ఇంధన సరఫరా వ్యవస్థతో కూడిన మెటాలిక్ మరియు నాన్-మెటాలిక్ ఎయిర్ ఫ్రేమ్ విభాగాలు ఉన్నాయి. పరీక్ష సమయంలో, నిర్మాణ సమగ్రత మరియు క్రియాత్మక పనితీరు నిరూపించబడ్డాయి. బ్రహ్మోస్ యొక్క ఎయిర్ వెర్షన్ చివరిగా జులై 2021లో పరీక్షించబడింది.

రక్షణ మంత్రి శ్రీ రాజ్‌నాథ్ సింగ్, డిఫెన్స్ రీసెర్చ్ అండ్ డెవలప్‌మెంట్ ఆర్గనైజేషన్ (DRDO), బ్రహ్మోస్, ఇండియన్ ఎయిర్ ఫోర్స్ మరియు పరిశ్రమలను విజయవంతంగా టెస్ట్ ఫైరింగ్‌పై ప్రశంసించారు. విమాన పరీక్షలో పాల్గొన్న బృందాలను అభినందిస్తూ, రక్షణ శాఖ కార్యదర్శి, R&D మరియు చైర్మన్ DRDO డాక్టర్ జి సతీష్ ఈ సంక్లిష్ట క్షిపణి వ్యవస్థ అభివృద్ధి, పరీక్ష, ఉత్పత్తి మరియు ఇండక్షన్‌లో DRDO, విద్యాసంస్థలు, నాణ్యత హామీ & ధృవీకరణ ఏజెన్సీలు, ప్రభుత్వ రంగ సంస్థలు మరియు భారత వైమానిక దళానికి చెందిన వివిధ ప్రయోగశాలలు పాల్గొన్నాయని రెడ్డి చెప్పారు.

బ్రహ్మోస్ అనేది సూపర్సోనిక్ క్రూయిజ్ క్షిపణి అభివృద్ధి, ఉత్పత్తి మరియు మార్కెటింగ్ కోసం భారతదేశం (DRDO) మరియు రష్యా (NPOM) మధ్య జాయింట్ వెంచర్. బ్రహ్మోస్ అనేది ఇప్పటికే సాయుధ దళాలలో చేర్చబడిన శక్తివంతమైన ప్రమాదకర క్షిపణి ఆయుధ వ్యవస్థ.

https://pib.gov.in/PressReleasePage.aspx?PRID=1779276

The Indian EXPRESS

Thu, 09 Dec 2021

Brahmos air version tested from IAF's Sukhoi-30, cleared for serial production

The missile launched from the aircraft followed the pre-planned trajectory meeting all mission objectives in the test that was conducted from Integrated Test Range, Chandipur off the coast of Odisha at 10.30 am on Wednesday.

By Sushant Kulkarni

Pune: The air version of BrahMos supersonic cruise missile was successfully test-fired from the Indian Air Force's frontline fighter aircraft Sukhoi 30 MKI on Wednesday morning, thus clearing the system for the serial production of air-version BrahMos missiles within the country, the Ministry of Defence has said.

Air version of BrahMos supersonic cruise missile successfully test-fired from Sukhoi 30 MK-I. (Twitter/DRDO_India)

Calling the test a 'copy book flight', the missile launched from the aircraft followed the pre-planned trajectory meeting all mission objectives in the test that was conducted from Integrated Test Range, Chandipur off the coast of Odisha at 10.30 am.

A combination of the names of Brahmaputra and Moskva rivers, BrahMos missiles are designed, developed and produced by BrahMos Aerospace, a joint venture company set up by Defence Research and Development Organisation (DRDO) and NPO Mashinostroyenia of Russia. Various versions of the BrahMos, including those which can be fired from land, warships, submarines and Sukhoi-30 fighter jets have already been developed and successfully tested in the past. In the press statement about the Wednesday test, the MoD said, "The launch is a major milestone in the BrahMos development. It clears the system for the serial production of air-version BrahMos missiles within the country. Major airframe assemblies which form the integral part of the Ramjet Engine are indigenously developed by Indian Industry. These include metallic and non-metallic air frame sections comprising Ramjet fuel tank and pneumatic fuel supply system. During the test, the structural integrity and functional performance have been proven. The air version of BrahMos was last flight tested in July 2021."

On November 22, 2017, Brahmos was successfully flight-tested for the first time from the IAF's frontline fighter aircraft Sukhoi-30MKI against a sea-based target in the Bay of Bengal and has since been successfully tested multiple times. BrahMos equipped Sukhoi-30s — which have a range of 1500 kilometres at a stretch without mid-air refuelling — are considered as key strategic deterrence for the adversaries both along the land borders and in the strategically important Indian Ocean Region. IAF is reported to have integrated BrahMos with multiple Sukhoi-30 fighter jets across the various strategic bases.

The Wednesday press statement said, "Defense Minister Rajnath Singh has praised DRDO, BrahMos, Indian Air Force and the industry on the successful test firing. Congratulating the teams involved in the flight test, Chairman DRDO Dr G Satheesh Reddy said various laboratories of DRDO, academic institutions, quality assurance and certification agencies, Public Sector undertakings and Indian Air Force participated in the development, testing, production and induction of this complex missile system."

In November last year, back to back tests of Brahmos's land, sea and air versions were conducted. Land-based BrahMos formations along the borders, BrahMos equipped Sukhoi-30s at bases in Northern theatre and Southern peninsula, and BrahMos capable Naval assets deployed in sea form a formidable deterrence, officials said.

https://indianexpress.com/article/cities/pune/brahmos-air-version-tested-from-iafs-sukhoi-30-cleared-for-serial-production-7662814/

Business Standard

Thu, 09 Dec 2021

DRDO successfully test-fires air version of BrahMos cruise missile: Report

The launch has cleared the way for serial production of air-version BrahMos missiles: Report

Balasore (Odisha): India on Wednesday successfully test-fired the air version of the BrahMos supersonic cruise missile from the integrated test range of Chandipur, off the coast of Odisha, sources in the DRDO said.

The offensive missile weapon system has been inducted into the Armed Forces

Describing the mission as a "major milestone" in the development of BrahMos, the sources said that the air version of the missile was test-fired from supersonic fighter aircraft Sukhoi 30 MK-I at 10.30 am.

The "copy book flight" followed the pre-planned trajectory and met all objectives, the sources in Defence Research and Development Organisation (DRDO) said.

The launch has cleared the way for serial production of air-version BrahMos missiles, they said.

Congratulating the teams involved in the flight test, Dr G Satheesh Reddy, the secretary in the department of Defence Research and Development and chairman of DRDO, said various laboratories at the premier agency, academic institutions, public sector undertakings and Indian Air Force (IAF) participated in the testing, production and induction of this complex missile system.

Defence Minister Rajnath Singh has praised the DRDO, Indian Air Force and other stakeholders on the success of the mission, the sources added.

BrahMos is a joint venture between India (DRDO) and Russia (NPOM) for the development, production and marketing of the supersonic cruise missile.

The offensive missile weapon system has been inducted into the Armed Forces.

The DRDO had on Tuesday flight-tested the Vertical Launch Short Range Surface to Air Missile, which will boost the capability of Indian Navy. PTI CORR.

(Only the headline and picture of this report may have been reworked by the Business Standard staff; the rest of the content is auto-generated from a syndicated feed.)

https://www.business-standard.com/article/current-affairs/drdo-successfully-test-fires-air-version-of-brahmos-cruise-missile-report-121120800560_1.html

पंजाब केसरी

Thu, 09 Dec 2021

DRDO ने ब्रह्मोस मिसाइल के आकाश से मार करने वाले संस्करण का सुखोई 30 विमान से किया सफल परीक्षण

By Bharat Verma

भारत में बुधवार को डीआरडीओ (रक्षा अनुसंधान एवं विकास संगठन) ने ओडिशा राज्य के चांदीपुर तट के एकीकृत परीक्षण रेंज से सुपरसोनिक क्रूज मिसाइल ब्रह्मोस का आकाश से मार करने वाले संस्करण का सफलतापूर्वक परीक्षण किया। रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के सूत्रों ने यह जानकारी दी। इस अभियान को ब्रह्मोस मिसाइल के विकास में प्रमुख मील का पत्थर बताते हुए सूत्रों ने कहा कि, मिसाइल के आकाश से मार करने वाले संस्करण का सुबह साढ़े 10 बजे सुपरसोनिक लड़ाकू विमान सुखोई 30 एमके-आई से परीक्षण किया गया।

सभी उद्देश्यों को किया पूरा

सूत्रों ने कहा कि परीक्षण के दौरान पूर्व-नियोजित प्रक्षेप पथ का पालन किया गया और सभी उद्देश्यों को पूरा किया गया। उन्होंने कहा कि, इस प्रक्षेपण से आकाश से मार करने वाले संस्करण वाली ब्रह्मोस मिसाइलों के बड़े पैमाने पर उत्पादन का रास्ता साफ कर दिया है। रक्षा अनुसंधान एवं विकास विभाग के सचिव और डीआरडीओ के अध्यक्ष डॉ. जी. सतीश रेड्डी ने परीक्षण में शामिल सभी टीम को बधाई देते हुए कहा कि, प्रमुख एजेंसी में विभिन्न प्रयोगशालाओं, शैक्षणिक संस्थानों, सार्वजनिक क्षेत्र के उपक्रमों और भारतीय वायुसेना (आईएएफ) ने इस जटिल मिसाइल प्रणाली के परीक्षण, उत्पादन और निर्माण में भाग लिया।

रक्षा मंत्री राजनाथ सिहं ने की प्रशंसा

इस सफलता के बारे में सूत्रों ने कहा कि रक्षा मंत्री राजनाथ सिंह ने मिशन की सफलता पर डीआरडीओ, भारतीय वायुसेना और अन्य हितधारकों की प्रशंसा की है। इस सुपरसोनिक क्रूज मिसाइल के विकास, उत्पादन और विपणन के लिए ब्रह्मोस भारत (डीआरडीओ) और रूस (एनपीओएम) के बीच एक संयुक्त उपक्रम है। आक्रामक मिसाइल हथियार प्रणाली को सशस्त्र बलों में शामिल किया गया है।

https://punjabkesari.com/india-news/drdo-successfully-test-fires-the-air-to-air-version-of-brahmos-missile-from-sukhoi-30-aircraft/

Thu, 09 Dec 2021

BrahMos Supersonic Missile successfully test fired by DRDO: All you need to know

India successfully test-fired air version of BrahMos Supersonic Cruise Missile. It will facilitate the serial production of BrahMos missiles in the country.

By Shailaja Tripathi

India successfully test-fired an air version of BrahMos Supersonic Cruise Missile on December 8, 2021, from the integrated test range of Chandipur, off Odisha Coast. The mission by DRDO has been described as a 'major milestone' in the development of BrahMos. The air version of the BrahMos missile was test-fired from the supersonic fighter aircraft Sukhoi 30 MK-I at 10.30 am.

BrahMos Supersonic Missile test

The test-firing of the BrahMos missile has been described as a major milestone in the development of BrahMos. As per DRDO, the launch of the supersonic missile also met all the objectives and has also cleared the way for the serial production of the air-version BrahMos Missile.

The secretary of the Department of Defence Research and Development and the Chairman of DRDO congratulated the teams that were involved with the flight test. Defence Minister Rajnath Singh also praised DRDO (Defence Research and Development Organisation), the Indian Air Force as well as other stakeholders behind the success of the mission.

Significance of BrahMos Supersonic Missile test firing

The launch of the BrahMos Supersonic Missile will be a major milestone in BrahMos development. The launch has cleared the system for the serial production of BrahMos missiles in India.

Major airframe assemblies that are responsible for forming an integral part of the Ramjet Engine are indigenously developed including the non-metallic airframe sections.

About BrahMos

BrahMos is a product of collaboration between India (DRDO) and Russia (NPOM) for the production, development and marketing of the supersonic cruise missile. The offensive missile weapon system has also been inducted into the Indian Armed Forces. The air version of BrahMos supersonic missile was last flight tested by DRDO in July 2021.

Short Range Surface to air Missile flight tested

The Defence Research and Development Organisation on December 7, 2021, also flight-tested the Vertical Launch Short Range Surface to Air Missile. The latest launch by India will further facilitate the Indian Navy in targeting aerial threats.

https://www.jagranjosh.com/current-affairs/brahmos-supersonic-missile-successfully-test-fired-all-you-need-to-know-1638961007-1

Thu, 09 Dec 2021

DRDO successfully test fires short range surface to air missile for Indian Navy- Check details

Launch of surface-to-air missile: Test firing of a short-range surface-to-air missile system will further enhance the defence capability of the Indian Naval Ships against aerial threats.

By Shailaja Tripathi

DRDO (Defence Research and Development Organisation) successfully test-fired a short-range surface-to-air missile off the coast of Odisha on December 7, 2021. A vertical-launched short-range missile will be deployed onboard various frontline ships of the Indian Navy. As per the Defence Ministry, the flight testing of the surface-to-air-missile system was conducted to validate the integrated operation of all its weapon system components.

The Defence Minister of India Rajnath Singh congratulated DRDO and the Indian Navy on the successful testing of surface-to-air missile. He also said that the latest missile system will further enhance the defence capability of the Indian Naval Ships against aerial threats. Chief Minister of Odisha Naveen Patnaik also tweeted about the successful test-firing of the missile system for the Indian Navy.

Short range surface to air missile

Launch of surface to air missile system

The launch of the short-range surface-to-air-missile system was conducted from a vertical launcher against an electronic target at a very low altitude in Odisha. The flight part of the missile along with health parameters was also monitored during the launch with the use of tracking instruments.

Details of short range surface-to-air-missile system

The newly launched missile for the Indian Navy has an operational range of 50 to 60 km. It features the mid-course inertial guidance through the fibre optic gyroscope as well as the optic radar homing in the terminal phase.

According to the Defence Ministry, all the sub-systems of the surface to air missile performed as per the expectation during the launch.

Why test firing of surface to air missile system was significant?

The launch of a short-range surface-to-air missile system for the Indian Navy was held to validate the integrated operation of all the weapon system components. It includes the canisterised flight vehicle, vertical launcher unit with controller and weapon control systems among others.

The first trial of the missile system was held on February 22, 2021, but this was a confirmatory trial to prove the consistent performance of the configuration and integrated operation.

India's successful tests of powerful missiles

To give a boost to the armed forces, India has successfully conducted tests of various powerful missiles. Some of them are:

1. India successfully launched Agni-5 in October 2021. It is a surface-to-surface ballistic missile.
2. In August 2021, India tested DRDO's Indigenous Technology Cruise Missile.
3. In July 2021, an indigenously developed New Generation AKASH missile (Akash-NG) was test-fired. It is a Surface to Air missile defence system.
4. Man-Portable Anti Tank Guided Missile was also flight tested by DRDO.
5. In June 2021, Agni-Prime- a new missile of the Agni series- was test-fired by DRDO.

https://www.jagranjosh.com/current-affairs/drdo-successfully-test-fires-short-range-surface-to-air-missile-for-indian-navy-check-details-1638950696-1

R. REPUBLICWORLD.COM

Thu, 09 Dec 2021

Gen Bipin Rawat no more: DRDO condoles demise of India's first Chief of Defence Staff

DRDO has paid homage to Chief of Defence Staff (CDS) Gen Bipin Rawat, who passed away in an unfortunate helicopter crash in Tamil Nadu's Coonoor

By Harsh Vardhan

The Defense Research and Development Organisation (DRDO) paid homage to Chief of Defence Staff (CDS) Gen Bipin Rawat, who passed away in an unfortunate helicopter crash in Tamil Nadu's Coonoor on Wednesday. Gen Rawat was among the 13 deceased passengers out of 14 who were on board the Mi17V5 helicopter that was bound for the Wellington Staff College. Taking to Twitter, DRDO expressed grief over the demise of Gen Rawat and called it a major loss to the country.

Image: ANI

India pays tribute to Gen Bipin Rawat

Soon after the news about the death of India's first CDS surfaced, many prominent leaders joined in to pay their tributes. The confirmation about Gen Rawat's demise was earlier confirmed by the Indian Air Force (IAF) in its statement released earlier on Twitter. in a thread of tweets, IAF wrote, "With deep regret, it has now been ascertained that Gen Bipin Rawat, Mrs Madhulika Rawat and 11 other persons on board have died in the unfortunate accident". Sadly enough, the 63-year-old Rawat was on his way to Wellington Staff College with his wife Mrs. Madhulika Rawat to deliver a lecture at 2:45 PM but the helicopter crashed just minutes before landing. The incident is even more hurtful as Gen Rawat had survived a helicopter crash that occurred in 2015 in Nagaland.

From Prime Minister Narendra Modi to Congress leader Rahul Gandhi, all have expressed their sadness for Gen Rawat and hailed his contributions to the country. "Gen Bipin Rawat was an outstanding soldier. A true patriot, he greatly contributed to modernising our armed forces and security apparatus. His insights and perspectives on strategic matters were exceptional. His passing away has saddened me deeply. Om Shanti", PM Modi wrote in his Twitter post.

https://www.republicworld.com/india-news/general-news/gen-bipin-rawat-no-more-drdo-condoles-demise-of-indias-first-chief-of-defence-staff.html

DRDO on Twitter

PRO Defence Pune @PRODefPune · 11h

ब्रह्मोस सुपरसोनिक क्रूज मिसाइल के वायु संस्करण का आज (08 दिसम्बर, 2021) ओडिशा के तट से दूर एकीकृत परीक्षण रेंज, चांदीपुर से प्रात: 10:30 बजे सुपरसोनिक लड़ाकू विमान सुखोई 30 एमके–I से सफलतापूर्वक परीक्षण किया गया।
pib.gov.in/PressReleasePa...

@SpokespersonMoD
@DRDO_India
@PIBMumbai

DRDO @DRDO_India · 22h

Air version of BrahMos supersonic cruise missile successfully test-fired from Sukhoi 30 MK-I
pib.gov.in/PressReleasePa...

ANI
@ANI

Air version of BrahMos supersonic cruise missile was successfully test-fired from supersonic fighter aircraft Sukhoi 30 MK-I from Integrated Test Range, Chandipur off Odisha coast today: DRDO

12:24 PM · Dec 8, 2021

DRDO
@DRDO_India

DRDO pays homage to General Bipin Rawat, the nation's first Chief of Defence Staff (CDS), his wife and 11 armed forces personnel. Untimely demise of General Rawat has left a deep void and is a major loss to the nation.

7:35 PM · Dec 8, 2021

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

President's Secretariat

Wed, 08 Dec 2021 1:42PM

President of India presents standard to the 22nd Missile Vessel Squadron of the Indian Navy

The President of India, Shri Ram Nath Kovind, presented President's Standard to the 22nd Missile Vessel Squadron of the Indian Navy in Mumbai, Maharashtra today (December 8, 2021).

Speaking on the occasion, the President congratulated all officers and sailors associated with the 22nd Missile Vessel Squadron for achieving this feat. He said that the presentation of the Standard is a testimony to the exceptional service rendered by officers and sailors, past and present, of this squadron to our nation.

The President noted that the ships of this squadron have been deployed for a multitude of operations. They are securing our maritime borders through mission based deployments. They are also undertaking diplomatic missions in the Gulf of Oman and Persian Gulf and anti-piracy operations.

President said that India is a maritime nation and the Indian Navy has a huge role to play in furtherance of our foreign policy and in protecting our national interests and commercial aspirations. It is a matter of great satisfaction that the Indian Navy has been successfully safeguarding our extensive maritime interests with resolve and tenacity. He said that a large share of global maritime trade transits through the Indian Ocean Region. Therefore, maintaining peace and tranquility in this region is of paramount importance, not only for us, but also for the entire global community. Today, as one of the largest navies in the world, the Indian Navy is looked upon by our maritime neighbours as a preferred security partner in the Indian Ocean region, he added.

The President said that the emerging geopolitical challenges in the Indo-Pacific region present India with an opportunity to play a pivotal role. He noted that as one of the leading navies of this region, the Indian Navy has invested significant effort in meeting all regional commitments and furthering our engagements with partners in the Indo-Pacific.

https://pib.gov.in/PressReleasePage.aspx?PRID=1779177

Press Information Bureau
Government of India

Ministry of Defence

Wed, 08 Dec 2021 6:58PM

INS Sudarshini deployment to gulf countries to enhance foreign training cooperation

Indian Navy's Sail Training Ship INS Sudarshini visited Port Sultan Qaboos, Muscat, Oman on 05 Dec 21 for a three day Operational Turn Round (OTR). The ship is part of the 1st Training Squadron based at Kochi which provides ab-initio sea experience to sea trainees of the Indian Navy. The ship is on a deployment to the Middle East aimed at strengthening 'Bridges of Friendship' with Friendly Foreign Countries in the region as also reach out to the Indian diaspora settled in the Gulf.

During her stay at Muscat, the ship's crew engaged extensively with the Royal Navy of Oman. The Commanding Officer, Cdr Srikanth Venugopal, paid an official visit to HQ Royal Navy of Oman (RNO) and interacted with Capt Ali Al Hosini, Director General Human Resources, RNO. Naval cooperation, training of young officers and aspects of sail training were amongst the subjects discussed. The ship also undertook operational exchanges in the form of visits to RNO Sail Training Ship *Shabab Oman II* and Wudham Naval Base, and also embarked five sea riders onboard for a sea experience sortie.

The Commanding Officer also called on HE Shri Amit Narang, Ambassador of India to Oman, Muscat. Ambassador along with the Indian Embassy staff also visited the ship and a familarisation tour was conducted onboard.

INS Sudarshini is an indigenously built Sail Training Ship (STS) built by Goa Shipyard Limited and based at Kochi, Kerala under the Southern Naval Command of the Indian Navy. The along with her sister ship, INS Tarangini form the sail training element of the 1st Training Squadron and has been imparting sail training to *IN* personnel as well as junior officers from friendly foreign countries.

https://pib.gov.in/PressReleasePage.aspx?PRID=1779428

Press Information Bureau
Government of India

Ministry of Defence

Wed, 08 Dec 2021 9:12AM

Vice Chief of Army Staff proceeds on a visit to Qatar

Lieutenant General C P Mohanty, Vice Chief of the Army Staff has proceeded on a two day visit to Qatar from 08 to 09 December 2021. During the visit, the Vice Chief will take forward the excellent defence cooperation between the State of Qatar and India through multiple meetings with senior functionaries of the Qatari security establishment.

The VCOAS is scheduled to call on the MOS for Defence Affairs, Chief of Staff, Qatar Armed Forces, Commander of Qatar Emiri Land Forces (QELF) and the Commandant of Ahmed Bin Mohammed Military College where he will exchange ideas on issues of mutual interest. The Vice Chief will visit the Headquarters of Qatar Emiri Land Forces, the Ahmed Bin Mohammed Military College and Amiri Guard HQ. A key aspect of the visit is his scheduled interaction with the senior leadership of leading Qatari Defence industries. This visit will further strengthen the bilateral defence cooperation between both the nations.

https://pib.gov.in/PressReleasePage.aspx?PRID=1779085

ZEENEWS

Thu, 09 Dec 2021

Govt may appoint new CDS soon after General Bipin Rawat's sudden demise in IAF chopper crash

The sudden and untimely passing away of the Chief of Defence Staff (CDS) General Bipin Rawat in a military helicopter crash near Coonoor in Tamil Nadu has raised the big question about who will be his likely successor.

Edited By Ritesh K Srivastava

New Delhi: The sudden and untimely passing away of the Chief of Defence Staff (CDS) General Bipin Rawat in a military helicopter crash near Coonoor in Tamil Nadu has raised the big question about who will be his likely successor.

File image of late CDS Gen Bipin Rawat

Since the strategically important post can't be kept vacant for long, the government is mulling to appoint a new CDS soon. According to sources, the post of the Chief of Defence Staff will be filled in next seven to ten days. As per the rules, any Commanding officers or flag officers of the armed forces are eligible for the position.

Since there is no precedent in appointing the Chief of Defence Staff as General Bipin Rawat was the first occupant of the post, the government will have to consider certain points before making the key appointment. In government matters, precedent is extremely important and several aspects will have to be taken into consideration while appointing a new officer as the next CDS.

General Bipin Rawat was appointed the 26th Chief of Army Staff on December 31, 2016. He superseded two Army officers - Lieutenant Generals Praveen Bakshi and PM Hariz - to take charge of the Indian Army. While his appointment as the Indian Army Chief by superseding two officers was unusual, but it is also the prerogative of the government to make such appointments.

The officers who are eligible to become the CDS should be a four-star General or its equivalent ranks in the Indian Air Force (Air Chief Marshal) and the Indian Navy (Admiral). The person can also be a three-star officer in the Indian Army, Indian Air Force or Indian Navy but eligible to become a four-star officer in the respective services. So all the Army, IAF and Navy commanders are eligible. In the case of India's only tri-services command – The Andaman and Nicobar Command – the officer heading it is rotated among the three services. Similarly, in the case of the CDS, too, the same can be done, but this is up to the government how it decides to go about it.

General Rawat was also an advocate of integrated commands by bringing in the Army, IAF and Navy commands under one umbrella. But his untimely death, brings back the question of precedence once again into play. As he was the first appointee to the post of CDS, it is now up to the government to find an officer who can take charge of the crucial post. While General Rawat was appointed the CDS based on his vast military experience, the government can choose any eligible officer based on his expertise and political acuity.

It may be noted that Prime Minister Narendra Modi-led Cabinet Committee on Security (CCS) was briefed on Wednesday about the military helicopter crash that led to the death of Chief of Defence Staff (CDS) General Bipin Rawat and other defence personnel near Coonoor in Tamil Nadu. Besides Prime Minister Narendra Modi, the meeting was attended by Defence Minister Rajnath Singh, Home Minister Amit Shah, Finance Minister Nirmala Sitharaman and External Affairs Minister S Jaishankar, official sources said.

National Security Advisor (NSA) Ajit Doval, Principal Secretary to the Prime Minister PK Misra and Cabinet Secretary Rajiv Gauba also attended the meeting, in which the CCS members were briefed about the tragic incident.

The sources said the top cabinet brass expressed condolences on the death of General Rawat. It is believed that the appointment of new CDS also came up for discussion during the CCS meet.

Separately, Chief of Army Staff General MM Naravane briefed the Defence Minister about the crash and related issues. The Defence Minister also visited General Rawat's residence and spoke to his daughter. The CDS was on his way to the Defence Staff College in Wellington when the helicopter crashed near Coonoor in Tamil Nadu. The Indian Air Force (IAF) said a Court of Inquiry has been ordered into the accident.

https://zeenews.india.com/india/govt-may-appoint-new-cds-soon-after-general-bipin-rawats-sudden-demise-in-iaf-chopper-crash-2417419.html

Thu, 09 Dec 2021

चीन ने हाइपरसोनिक हथियार कार्यक्रम की गति बढ़ाई, क्या है भारत की स्थिति?

चीन (China) ने नई जेनरेशन की हाइपरसोनिक (Hypersonic) मिसाइल और एयरक्राफ्ट को विकसित करने की गति बढ़ा दी है। हाल ही में मिल रही खबरों के मुताबिक चीन ने हाइपरसोनिक हथियारों के मामले में अमेरिका (America) के साथ होड़ करते हुए अगली पीढ़ी की तकनीक पर उल्लेखनीय बढ़त हासिल की है। चीन के विमानन उद्योग निगम के तहत चल रहे एयरोडायनेमिक्स संस्थान ने नई विंड टनल के विकास की घोषणा की है। इस टनल को FL-64 नाम दिया गया है।

नई दिल्ली: चीन (China) **ने नई जेनरेशन की हाइपरसोनिक** (Hypersonic) **मिसाइल और एयरक्राफ्ट को विकसित करने की गति बढ़ा दी है। हाल ही में मिल रही खबरों के मुताबिक चीन ने हाइपरसोनिक हथियारों के मामले में अमेरिका** (America) **के साथ होड़ करते हुए अगली पीढ़ी की तकनीक पर उल्लेखनीय बढ़त**

हासिल की है। चीन के विमानन उद्योग निगम के तहत चल रहे एयरोडायनेमिक्स संस्थान ने नई विंड टनल के विकास की घोषणा की है। इस टनल को FL-64 नाम दिया गया है। वहीं, भारत भी प्रयास कर रहा है, इसके रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने 2020 में हाइपरसोनिक स्पीड फ्लाइट का सफल परीक्षण किया था। FL-64 को तैयार होने में दो साल लगे हैं, इसका निर्माण इसी तरह के उपकरणों की तुलना में रिकॉर्ड समय में किया गया है। विंड टनल बड़ी और जटिल होती है, इसमें हाइपरसोनिक जरूरतें जैसे उच्च तापमान, दबाव और गति शामिल होती है। इसका डायमीटर पहले वाले उपकरण का दोगुना है। यह 1,57,480 फीट की ऊंचाई पर माक 4 (गति का माप- माक 1 ध्वनि की गति होती है) से माक 8 की गति हासिल कर सकता है। इसके साथ ही यह 626 डिग्री तापमान पर चल सकता है। इसे 30 सेकंड से ज्यादा संचालित किया जा सकता है। इसके अलावा विमान की हाइपरसोनिक क्षमता को आंक सकता है। जिसमें एयरक्राफ्ट से हथियार को जोड़ना और अलग करना भी शामिल है। यही नहीं रिपोर्ट बताती हैं कि चीन जेएफ-22 हाइपरवेलोसिटी विंड टनल का भी निर्माण कर रहा है जिसकी क्षमता माक-30 है।

चीन ने हाइपरसोनिक हथियार कार्यक्रम में एक और सफलता पाई है. (सांकेतिक फोटो)

इस सुविधा के 2022 तक पूरा होने की उम्मीद की जा रही है। इसके बाद ये चीन के एयरोस्पेस और हाइपरसोनिक एयरक्राफ्ट कार्यक्रम में अपनी भागीदारी निभा सकेगा। जेएफ 12 चीन की पहली हाइपरसोनिक टनल है जो 2012 में तैयार हो गयी थी। जिसके पास माक 4 से माक 9 की गति है। हालांकि इन विंड टनल का इस्तेमाल हथियार विकसित करने तक ही सीमित नहीं है। चीन इसका इस्तेमाल विभिन्न बड़ी अंतरराष्ट्रीय प्रतियोगिताओं के लिए एथलीट तैयार करने में भी कर रहा है। एथलीट अपने प्रदर्शन को सुधारने के लिए अपने रोजाना के प्रशिक्षण में इन विंड टनल का इस्तेमाल करते हैं।

चीन बनाम अमेरिका

विंड टनल परियोजनाओं के मामले में अमेरिका अभी भी अव्वल है। इसके बाद दूसरा नंबर चीन का है। पिछले 6 दशकों में एवीआईसी और उससे संबद्ध एआरआई ने दर्जनों टनल का निर्माण किया है। एशिया टाइम्स मे प्रकाशित खबर के मुताबिक अमेरिका की सबसे आधुनिक विंड टनल लैंस 2 (लार्ज एनर्जी नेशनल शॉक टनल) है, जिसकी क्षमता 30 मिलीसेकंड में 3 से 9 माक फ्लाइट की है। लेकिन चीन अमेरिका को पछाड़ने में कोई कोर कसर नही छोड़ रहा है, पिछले पांच सालो में जहां अमेरिका ने 9 हाइपरसोनिक टेस्ट किए वहीं चीन सैकड़ों लॉन्च कर चुका है।

क्या होती है हाइपरसोनिक मिसाइल

हाइपरसोनिक मिसाइल, बैलिस्टिक मिसाइल की तरह ही ध्वनि की गति से पांच गुना ज्यादा तेज उड़ान भर सकती है। सामान्य बैलिस्टिक मिसाइल से यह कहीं ज्यादा विकसित होती है और आसमान में दुश्मन का आसानी से पता लगा लेती है। आम भाषा में समझें तो जो विमान 6126 से 12251 किमी प्रतिघंटा की रफ्तार से उड़े उसे हाइपरसोनिक विमान कहा जाता है।

भारत और हाइपरसोनिक हथियार भारत के रक्षा अनुसंधान और विकास संगठन (डीआरडीओ) ने 2020 में हाइपरसोनिक स्पीड फ्लाइट का सफल परीक्षण किया था। यह एचएसटीडीवी (हाइपरसोनिक टेक्नोलॉजी डिमोन्सट्रेटर व्हीकल) कहलाता है। इसके अलावा भारत हाइपरसोनिक ग्लाइडर हथियार भी बना रहा है, इसका परीक्षण भी किया जा चुका है।

https://hindi.news18.com/news/nation/china-accelerates-hypersonic-weapons-program-what-is-indias-position-3888368.html

PHYS.ORG

Thu, 09 Dec 2021

Transforming materials with light: Study could lead to ultrafast light-based computers and more

Imagine windows that can easily transform into mirrors, or super high-speed computers that run not on electrons but light. These are just some of the potential applications that could one day emerge from optical engineering, the practice of using lasers to rapidly and temporarily change the properties of materials.

A strong laser is seen illuminating a material in a low-temperature chamber. The laser is being used to change the material's degree of transparency. Credit: Caltech/David Hsieh Laboratory

"These tools could let you transform the electronic properties of materials at the flick of a light switch," says Caltech Professor of Physics David Hsieh. "But the technologies have been limited by the problem of the lasers creating too much heat in the materials."

In a new study in *Nature*, Hsieh and his team, including lead author and graduate student Junyi Shan, report success at using lasers to dramatically sculpt the properties of materials without the production of any excess damaging heat.

"The lasers required for these experiments are very powerful so it's hard to not heat up and damage the materials," says Shan. "On the one hand, we want the material to be subjected to very intense laser light. On the other hand, we don't want the material to absorb any of that light at all." To get around this the team found a "sweet spot," Shan says, where the frequency of the laser is fine-tuned in such a way to markedly change the material's properties without imparting any unwanted heat.

The scientists also say they found an ideal material to demonstrate this method. The material, a semiconductor called manganese phosphor trisulphide, naturally absorbs only a small amount of light over a broad range of infrared frequencies. For their experiments, Hsieh, Shan, and colleagues used intense infrared laser pulses, each lasting about 10^{-13} seconds, to rapidly change the energy of electrons inside the material. As a result, the material shifted from a highly opaque state, for certain colors of light, to becoming highly transparent.

Even more critical, the researchers say, is the fact that the process is reversible. When the laser turns off, the material instantly goes back to its original state completely unscathed. This would not be possible if the material had absorbed the laser light and heated up, because it would take a long time for the material to dissipate the heat. The heat-free manipulation used in the new process is known as "coherent optical engineering."

The method works because the light alters the differences between the energy levels of electrons in the semiconductor (called band gaps) *without* kicking the electrons themselves into different energy levels, which is what generates heat.

"It's as if you have a boat, and then a big wave comes along and vigorously rocks the boat up and down without causing any of the passengers to fall down," explains Hsieh. "Our laser is vigorously rocking the energy levels of the material, and that alters the materials' properties, but the electrons stay put."

Researchers have previously theorized how this method would work. For example, in the 1960s, Caltech alumnus Jon H. Shirley (Ph.D. '63), put forth mathematical ideas about how to solve for

electron-energy levels in a material in the presence of light. Building on this work, Hsieh's Caltech team collaborated with theorists Mengxing Ye and Leon Balents from UC Santa Barbara to calculate the expected effects of laser illumination in manganese phosphor trisulphide. The theory matched the experiments with "remarkable" accuracy, says Hsieh.

The findings, Hsieh says, mean that other researchers can now potentially use light to artificially create materials, such as exotic quantum magnets, which would have been otherwise difficult or even impossible to create naturally.

"In principle, this method can change optical, magnetic and many other properties of materials," says Shan. "This is an alternative way of doing materials science. Rather than making new materials to realize different properties, we can take just one material and ultimately give it a broad range of useful properties."

The study is titled "Giant modulation of optical nonlinearity by Floquet engineering." Other authors include Hao Chu (Ph.D. '17), and Sungmin Lee and Je-Geun Park of Seoul National University.

More information: David Hsieh, Giant modulation of optical nonlinearity by Floquet engineering, *Nature* (2021). DOI: 10.1038/s41586-021-04051-8. www.nature.com/articles/s41586-021-04051-8

Journal information: *Nature*

https://phys.org/news/2021-12-materials-ultrafast-light-based.html

Thu, 09 Dec 2021

Optical cavities could be key to next generation interferometers

A new concept has been developed that has the potential to assist new instruments in the investigation of fundamental science topics such as gravitational waves and dark matter.

The concept is described in a paper written by UK Quantum Technology Hub Sensors and Timing researchers at the University of Birmingham and published in *Communications Physics*, and a related patent application filed by University of Birmingham Enterprise.

It proposes a new method of using optical cavities to enhance atom interferometers—highly sensitive devices that use light and atoms to make ultra-precise measurements.

Although itself challenging to implement, the concept presents a method of overcoming substantial technological challenges involved in the pursuit of atom interferometers operating at extreme momentum transfer—a technique which would allow atoms to be placed into a quantum superposition over large distances.

This is key to enabling the sensitivities required for these devices to investigate signals from dark matter and gravitational waves. The exploration of dark matter, and the detection of gravitational waves from the very early Universe is key to developing our collective knowledge of fundamental physics.

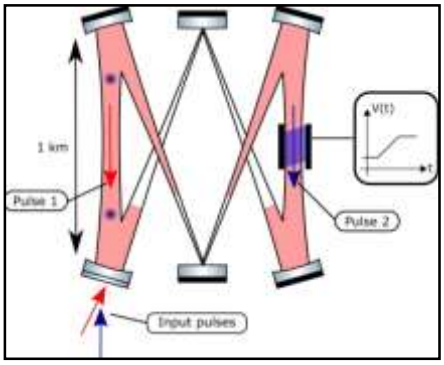


Fig. 1: Circulating pulse interferometry schematic. Circulating pulses occupy each of the two running wave modes in this example cavity, 6 km round trip with a 1 km baseline aligned with gravity. On each round trip, additional light is coupled into the cavity to compensate for losses. Serrodyne modulation, applied through a Pockels cell, shifts the frequency of each pulse on each pass to compensate for Doppler shifts. The pulse durations are maximized within the constraint that only one pulse may pass through the atoms (blue) or Pockels cell at a time. Credit: DOI: 10.1038/s42005-021-00754-6

The new paper, written by Dr. Rustin Nourshargh, Dr. Samuel Lellouch and colleagues from the School of Physics and Astronomy, describes how synchronization of the input pulses, to realize a

spatially resolved circulating pulse within the optical cavity, can facilitate a large momentum transfer without the need for drastic improvements in available laser power.

Investigating dark matter and gravitational waves will not only facilitate a better understanding of the Universe's history, but will also drive new ideas for improving the future sensitivity of atom interferometers. This will also be relevant to further exploiting atom interferometry in practical applications, such as providing new tools for navigation through enabling increased resilience against loss of GPS signals.

Dr. Rustin Nourshargh, former doctoral researcher at the University of Birmingham and now Scientist at Oxford Ionics, said: "This optical cavity scheme offers a route to meeting the immense laser power requirements for future atom based gravitational wave detectors."

Dr. Samuel Lellouch, Research Fellow at the University of Birmingham, said: "By overcoming some of the most severe current technological barriers, this original scheme has a real potential to enable disruptive sensitivity levels in large-scale atom interferometers."

More information: Rustin Nourshargh et al, Circulating pulse cavity enhancement as a method for extreme momentum transfer atom interferometry, *Communications Physics* (2021). DOI: 10.1038/s42005-021-00754-6

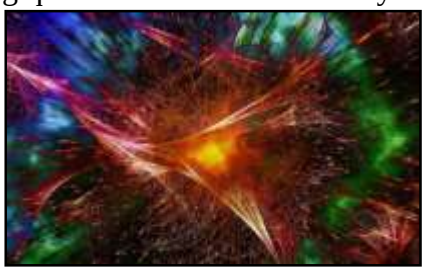
Journal information: *Communications Physics*

https://phys.org/news/2021-12-optical-cavities-key-interferometers.html

Thu, 09 Dec 2021

Physical features boost the efficiency of quantum simulations

Recent theoretical breakthroughs have settled two long-standing questions about the viability of simulating quantum systems on future quantum computers, overcoming challenges from complexity analyses to enable more advanced algorithms. Featured in two publications, the work by a quantum team at Los Alamos National Laboratory shows that physical properties of quantum systems allow for faster simulation techniques.



Credit: Pixabay/CC0 Public Domain

"Algorithms based on this work will be needed for the first full-scale demonstration of quantum simulations on quantum computers," said Rolando Somma, a quantum theorist at Los Alamos and coauthor on the two papers.

Low-energy quantum states key to faster quantum simulation

The paper "Hamiltonian simulation in the low-energy subspace" demonstrates that the complexity of a quantum simulation algorithm depends on the relevant energy scale and not the full range of energies of the system, as previously thought. In fact, some quantum systems can have states of unbounded energies, hence simulations would prove intractable even on large quantum computers.

This new research found that, if a quantum system explores the low-energy states only, it could be simulated with low complexity on a quantum computer without errors crashing the simulation.

"Our work provides a path to a systematic study of quantum simulations at low energies, which will be required to push quantum simulations closer to reality," said Burak Şahinoğlu, a theoretical physicist at Los Alamos and lead author on the paper, published in the journal Quantum Information, a *Nature* partner journal.

"We show that at every step of the algorithm, you never escape to the very large energies," said Somma. "There's a way of writing your quantum algorithm so that after each step you're still within your low-energy subspace."

The authors said their research applies to a large class of quantum systems and will be useful in simulating quantum field theories, which describe physical phenomena within their low-energy states.

Fast-forwarding of quantum systems bypasses the time-energy uncertainty principle

The other paper, "Fast-forwarding quantum evolution," a collaboration with Caltech's Shouzhen Gu—a former Los Alamos quantum computing summer school student—is published in Quantum. It shows three quantum systems in which a quantum simulation algorithm can run faster—and in some cases exponentially faster—than the limits suggested by the time-energy uncertainty principle.

"In quantum mechanics, the best precision that can be achieved when measuring a system's energy scales, in general, with the inverse of the duration of the measurement," said Somma.

"However, this principle does not apply to all quantum systems, especially those that have certain physical features," said Şahinoğlu.

The authors showed that when this principle is bypassed, such quantum systems can also be simulated very efficiently, or fast-forwarded, on quantum computers.

More information: Burak Şahinoğlu et al, Hamiltonian simulation in the low-energy subspace, *npj Quantum Information* (2021). DOI: 10.1038/s41534-021-00451-w

Shouzhen Gu et al, Fast-forwarding quantum evolution, *Quantum* (2021).

DOI: 10.22331/q-2021-11-15-577

https://phys.org/news/2021-12-physical-features-boost-efficiency-quantum.html

COVID-19 Research News

WebMD

Thu, 09 Dec 2021

COVID-19 Antibodies get stronger with repeated vax 'boosts'

Dec. 8, 2021 -- New research helps bolster the argument for getting COVID-19 booster shots now, even though the formulations are not specifically targeted to the latest Omicron and Delta variants, researchers suggest in a paper published this week.

Senior author Otto Yang, MD, professor in UCLA's division of infectious diseases and of microbiology, immunology, and molecular genetics, says their findings, published in the peer-reviewed journal *mBio*, suggest good news about boosters.

The researchers, led by F. Javier Ibarrondo, PhD, also from UCLA, compared immune reactions in 15 vaccinated people who had not been infected with the coronavirus and 10 people who were infected before vaccination. Most had received the Pfizer or Moderna two-dose mRNA vaccines.

They evaluated how antibodies act against a panel of seven spike variant combinations of five mutations. They studied people shortly after they recovered from a mild case of COVID-19 after experiencing symptoms no later than April 2020. They then compared this group with people never infected who were evaluated shortly after vaccination.

Yang said they found that people who had had COVID-19 and then got vaccinated developed not only more antibodies to the virus but a higher quality of antibodies, more equipped to take on variants.

The antibodies produced by either just getting COVID-19 or by getting vaccinated without having had COVID had difficulty protecting against certain variants, Yang says.

"But when we looked at the combination of the two — so people who had had COVID and who got vaccinated after they'd had COVID — they developed much more efficient antibodies that could deal with all the spike variants that we tested," he says.

Making B Cells Stronger

Yang says boosters were not available at the time of the study, but said it is a small leap to predict that they behave similarly.

"We only show this in the case of COVID plus vaccination," he says, "but COVID plus vaccination is not that different from vaccinations plus vaccination (booster)."

Yang says it follows a basic concept in antibody research: somatic hypermutation.

"Once the B cells make antibodies, the longer those B cells are exposed to the things they're making antibodies against the more they continue to modify those antibodies to be better," he says. "It fits what we expect but it's perhaps faster than we expected — this improvement of antibodies — so it's good news."

Even within the fairly limited scenarios the researchers tested, the B cells can continue to improve, he says.

"It suggests that if we get boosters, the additional exposure from the vaccine will not only increase the amount of antibodies after [they've] drifted down, but will also improve the quality of those antibodies," Yang says.

The authors say in the paper, "Whether this can also be accomplished in SARS-CoV-2-naive persons through vaccination alone, such as delivering supplemental doses beyond the original vaccination regimen of two doses, remains to be determined."

Yang says a common argument he hears against the boosters is that people are waiting because they think a booster targeted to a specific variant is around the corner.

"What this (study) suggests — is if you get the booster now you will still get some additional benefit against these variants even though the vaccine is not specifically tailored against the variants," Yang says.

He says that by the time their work was published, other studies, referenced in the paper, had come out showing similar findings.

https://www.webmd.com/vaccines/covid-19-vaccine/news/20211208/antibodies-stronger-with-boosters