July
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समाचार पत्रों से चयित अंश
Newspapers Clippings

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Press Information Bureau
Government of India

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Wed, 28 July 2021 5:07PM

Anti-Drone System

DRDO has developed anti-drone system to neutralize enemy drone attack. The Indigenous Drone Technology is capable of counter attacks including detection, Soft Kill (for jamming the communication links of Drone) and Hard Kill (Laser based hard kill to destroy the Drone) of enemy Drones. The System is already demonstrated to Armed Services and other internal security agencies.

The indigenous DRDO Counter-Drone Technology is transferred to M/s BEL.Simultaneously Transfer of Technology (ToT) of the Counter-Drone System is offered to other companies.

This information was given by Raksha Rajya Mantri Shri Ajay Bhatt in a written reply to ShrimatiKeshari Devi Patel and Shri KanakmalKatarain Lok Sabha today.

https://pib.gov.in/PressReleasePage.aspx?PRID=1739951

Hindustan Times

Thu, 29 July 2021

861 candidates complete online training in cyber security, AI & ML

As many as 861 candidates have successfully completed the 12-week-long "Online Training and Certification Course (OTCC) in Cyber Security, Artificial Intelligence and Machine Learning (AI & ML)" conducted by the Defence Institute of Advanced Technology (DIAT) in collaboration with the Defence Research and Development Organisation (DRDO)

Pune: As many as 861 candidates have successfully completed the 12-week-long "Online Training and Certification Course (OTCC) in Cyber Security, Artificial Intelligence and Machine Learning (AI & ML)" conducted by the Defence Institute of Advanced Technology (DIAT) in collaboration with the Defence Research and Development Organisation (DRDO).

The online course was aimed at supporting the "Skill India Mission" by imparting training in building skill sets in using cyber security tools and techniques. It covered advanced topics such as forensic and incident response, malware analysis, reverse engineering, vulnerability analysis, exploit mitigation and penetration test along with tools to train on various cyber security techniques.

Over the duration of the course, expert lectures were organised by eminent faculties and scientists from DIAT, DRDO, the industry and renowned universities. Course evaluation was conducted through continuous online module-wise tests based on theory and runtime challenges to finalise results for the award of certificates. Participants gave a very positive feedback upon

completion of the course. The DIAT team personally interacted with the toppers for them to share their experience and give valuable suggestions for future editions of the course.

Dr C P Ramanarayanan, vice-chancellor, DIAT, praised a Class 12 student, Vishal Juneja, who was also permitted to join the course as an exceptional case in view of his excellent performance in the entrance examination. Juneja not only scored 74% in the entrance exam, but also secured 6th position in his batch.

On the occasion, Dr G Satheesh Reddy, chairman, DRDO, congratulated the participants and the organising team for successfully conducting the online training course supporting the "Skill India Mission". Meanwhile, Dr Ramanarayanan informed that the third batch for the course will begin from the second week of September this year.

https://www.hindustantimes.com/cities/pune-news/861-candidates-complete-online-training-in-cyber-security-ai-ml-101627483907841.html

Thu, 29 July 2021

भारत से लंदन भेजी गई ये सबसे खतरनाक मिर्च, DRDO ने बनाया है इससे मिर्ची बम

इसकी खेती नागालैंड में ही होती है। नागालैंड सरकार को इस मिर्च के लिए साल 2008 में जीआई टैग यानी ज्योग्राफिकल इंडेक्स हासिल हुआ था। असम का तेजपुर और नागालैंड, मणिपुर, मिजोरम का इलाका भूत जोलोकिया की खेती के लिए मशहूर है।

Edited By: आशुतोष वर्मा

पूर्वोत्तर क्षेत्र के जीआई संबंधी उत्पादों के निर्यात को बढ़ावा देने के मकसद से नागालैंड के 'राजा मिर्च', जिसे किंग चिली भी कहा जाता है, की एक खेप को बुधवार को हवाई मार्ग से गुवाहाटी के रास्ते लंदन निर्यात किया गया है। किंग चिली की इस खेप को स्कोविल हीट यूनिट्स (एसएचयू) के आधार पर दुनिया की सबसे तीखी भी माना जाता है। इस खेप को नागालैंड के पेरेन जिले के एक हिस्से, तेनिंग, से मंगवाया गया था और उसे गुवाहाटी में एपीडा से सहायता प्राप्त पैकहाउस में पैक किया गया था। नागालैंड की इस मिर्च को भूत जोलोकिया और घोस्ट पेपर भी कहा जाता है। इसे 2008 में जीआई सर्टिफिकेशन मिला था। आइए आपको दुनिया की इस सबसे तीखी मिर्च के बारे में बताते हैं।

ये दुनिया की सबसे तीखी मिर्च है.

वर्ल्ड रिकॉर्ड में आया है नाम

भुत जोलकिया दुनिया की दूसरे नंबर की सबसे तीखी मिर्च है। यह मैक्सिको की रेड सैविना मिर्च से भी दोगुनी तीखी तो कैयानिन मिर्च जिसे हाबैनेरो मिर्च के तौर पर जानते हैं, उससे तीन गुनी तीखी है। भुत जोलकिया को घोस्ट पैपर के नाम से भी जानते हैं। साल 2007 में इस मिर्च को गिनीज वर्ल्ड रिकॉर्ड्स में जगह मिली थी। यह मिर्च उस समय टोबैसको सॉस से भी 400 गुना ज्यादा तीखी थी। डॉक्टर पॉल

बोस्लैंड जिन्होंने इस मिर्च की खोज की थी, उनके मुताबिक इस मिर्च की एक सही मात्रा बहुत कम समय में किसी की भी जान ले सकती है। इस मिर्च का बायोलॉजिकल नाम कैपसिकम चीनेंस है।

साल 2008 में मिला GI टैग

इसकी खेती नागालैंड में ही होती है। नागालैंड सरकार को इस मिर्च के लिए साल 2008 में जीआई टैग यानी ज्योग्राफिकल इंडेक्स हासिल हुआ था। असम का तेजपुर और नागालैंड, मणिपुर, मिजोरम का इलाका भूत जोलोकिया की खेती के लिए मशहूर है। एक बार इस मिर्च की खेती ग्वालियर में की गई मगर तो वो जरा भी तीखी नहीं थी। भूत जोलोकिया की फसल ज्यादा बारिश में खराब हो जाती है, बिल्कुल बारिश न हो तो भी सूख जाती है। पक जाने के बाद भूत जोलोकिया का आकार 6 से 8 सेंटीमीटर का होता है। अक्सर यह पकने पर लाल रंग की होती है, पर कभी कभी संतरा और चाकलेट के रंग की भी दिखाई देती है।

मिर्ची से बना हथियार

भूत जोलोकिया मिर्च सिर्फ खाने का स्वाद बढ़ाती हो ऐसा नहीं है। इस मिर्च का प्रयोग हथियार के तौर पर भी करते हैं। यह नागा व्यंजन का जरूरी हिस्सा है। चटनी और सब्जियों का स्वाद बढ़ाने के लिए इसका इस्तेमाल किया जाता है। नागा रेसिपी में पोर्क, सूखी मछली से बने व्यंजन इस मिर्च के बिना अधूरे हैं। साल 2009 में डिफेंस रिसर्च डिजाइन ऑर्गनाइजेशन (डीआरडीओ) ने भूत जोलोकिया के हैंड ग्रेनेड में इस्तेमाल पर विचार किया। तेजपुर स्थित डीआरडीओ की लैब ने इस मिर्च से प्रेरित होकर एक चिली ग्रेनेड या मिर्ची बम बनाया था। वहीं, साल 2016 में पैलेट गन में भी इसके इस्तेमाल के प्रस्ताव पर विचार किया गया, जिससे कि उग्रवादियों को तुरंत तितर-बितर किया जा सके।

https://www.tv9hindi.com/knowledge/king-chilli-raja-mircha-from-nagaland-exported-to-london-for-the-first-time-know-all-about-this-hottest-pepper-756473.html

दैनिक भास्कर

Thu, 29 July 2021

प्रदेश का दूसरा सैनिक स्कूल होगा भिंड में:100 करोड़ की लागत से 52 एकड़ में तैयार होगा सैनिक स्कूल, डीआरडीओ से मिलेगी प्रदेश सरकार को राशि

सैनिक स्कूल सोसायटी की ओर से डीआडीओ एडिशनल डायरेक्टर को लिखा पत्र

भिंड: मध्य प्रदेश का दूसरा सैनिक स्कूल भिंड के मालनपुर में खोले जाने की तैयारी शुरू हो चुकी है। स्कूल के निर्माण पर करीब सौ करोड़ रुपए खर्च किया जाएगा। इसके लिए सैनिक स्कूल सोसायटी के अंडर सेक्रेटरी की ओर से डीआरडीओ के एडिशनल डायरेक्टर को पत्र लिखकर 100 करोड़ की राशि को 2021-22 के बजट में शामिल करने के लिए कहा गया है। पत्र बीते 19 जुलाई को लिखा गया था। अब डीआरडीओ की ओर से स्वीकृत बजट से प्रदेश सरकार सैनिक स्कूल का निर्माण कराएगी।

अब तक मध्य प्रदेश में एक मात्र सैनिक स्कूल हुआ करता था। भिंड में सैनिक स्कूल को लेकर तत्कालीन सांसद डॉ/ भागीरथ प्रसाद के प्रयासों के बाद रक्षा मंत्रालय भारत सरकार ने 3 अक्टूबर 2018 में भिंड जिले के लिए सैनिक स्कूल खोले जाने की हरीझंडी दिखाई थी। रक्षा मंत्रालय की ओर से सैनिक

स्कूल स्वीकृत के बाद मुख्यमंत्री शिवराज सिंह चौहान ने मालनपुर में 52 एकड़ जमीन एक रुपए के टोकन पर सैनिक स्कूल सोसायटी को देने की मंजूरी दी है। उल्लेखनीय है कि 5 जुलाई 2021 को रक्षा मंत्री राजनाथ सिंह और रक्षा सचिव के बीच वीडियो कान्फ्रेंसिंग के माध्यम से मालनपुर में सैनिक स्कूल खोले जाने को लेकर समीक्षा बैठक की गई थी। इस बैठक में राज्य सरकार से सैनिक स्कूल को लेकर रिवाइज डीपीआर मांगी गई थी। राज्य सरकार ने 12 जुलाई को संशोधित डीपीआर भिजवाया गया था। इस डीपीआर में स्कूल के लिए 101 करोड़ रुपए की लागत राशि प्रस्तावित की। इस प्रस्ताव के बाद सैनिक स्कूल सोसायटी के अंडर सेक्रेटरी प्रवीण ने डीआरडीओ के एडीशनल डायरेक्टर को पत्र लिखकर मालनपुर में सैनिक स्कूल के लिए 100 करोड़ रुपए अपने बजट 2021-22 में शामिल करने के लिए उल्लेख किया है।

दो से तीन वर्ष लगेगा स्कूल निर्माण में

बजट का प्रावधान होने से अब राज्य सरकार सैनिक स्कूल का निर्माण प्रदेश सरकार की एजेंसी से कराएगी। स्कूल निर्माण होने में दो.तीन वर्ष का समय लगेगा। ऐसे में अस्थायी भवन में सैनिक स्कूल का शुभारंभ करवा दिया जाए।

भिंड को मिलेगी नई पहचान

सैनिक स्कूल खोले जाने पर देशभर के छात्र, यहां पढ़ाई के लिए आएंगे। यह स्कूल मालनपुर के नजदीक खोले जाने से छात्रों की आवाजाही के लिए सुगम साधन रहेगा। यहां रेलवे और हवाई अड्डे के नजदीक है। इस तरह से भिंड को सैनिक स्कूल खोले जाने पर देश भर में नई पहचान मिलेगी।

https://www.bhaskar.com/local/mp/bhind/news/sainik-school-will-be-ready-in-52-acres-at-a-cost-of-100-crores-the-state-government-will-get-the-amount-from-drdo-128753810.html

COVID 19: DRDO's Contribution

THE NEW INDIAN EXPRESS

Thu, 29 July 2021

DRDO to get 2 per cent royalty from Dr Reddy's on sale of anti-COVID drug 2-DG in India: Government

The Drugs Controller General of India (DCGI) approved the 2-deoxy-D-glucose (2-DG) drug for emergency use as an adjunct therapy in moderate to severe coronavirus patients in early May

New Delhi:: The Defence Research and Development Organisation (DRDO) will get two per cent royalty from Dr Reddy's Laboratory (DRL) on the sale of anti-COVID drug 2-DG, Minister of State for Defence Ajay Bhatt said on Wednesday.

Defence Minister Rajnath Singh and Union Health Minister Dr Harsh Vardhan releasing the first batch of Anti-COVID drug 2DG developed by DRDO on 17 May, 2021. (File photo | ANI)

In a written reply to a question in the Lok Sabha, Bhatt said the DRDO developed the technology (for 2-DG) along with DRL, Hyderabad.

The pricing is solely decided by DRL.

The actual price fixed by Dr Reddy lab is Rs 990 per sachet, he said.

The DRDO works under the Defence Ministry.

DRL is a private listed company.

"DRDO will get 2 per cent royalty on the sale of 2-DG in the Indian market as per Transfer of Technology agreement," Bhatt said.

The Drugs Controller General of India (DCGI) approved the 2-deoxy-D-glucose (2-DG) drug for emergency use as an adjunct therapy in moderate to severe coronavirus patients in early May.

The first batch of this oral drug, developed by the DRDO was released on May 17 by Defence Minister Rajnath Singh and then Health Minister Harsh Vardhan.

The Defence Ministry on May 8 had said that the clinical trials of 2-DG showed that it helps in faster recovery of hospitalised patients and reduces supplemental oxygen dependence.

The drug comes in powder form in sachet and is taken orally by dissolving it in water.

https://www.newindianexpress.com/business/2021/jul/28/drdo-to-get-2-per-cent-royalty-from-dr-reddys-on-sale-of-anti-covid-drug-2-dg-in-india-government-2336786.html

Hindustan Times

Thu, 29 July 2021

IGIMS to have 60-kilo litre oxygen storage capacity, 3 generation plants

The Indira Gandhi Institute of Medical Sciences (IGIMS), an autonomous institution on the pattern of AIIMS-Delhi, will be the state's first medical college hospital to have an oxygen storage capacity of 60-kilo litres in addition to having three pressure swing adsorption (PSA) oxygen generation plants

By Ruchir Kumar

The Indira Gandhi Institute of Medical Sciences (IGIMS), an autonomous institution on the pattern of AIIMS-Delhi, will be the state's first medical college hospital to have an oxygen storage capacity of 60-kilo litres in addition to having three pressure swing adsorption (PSA) oxygen generation plants.

Together, the three oxygen plants will have a capacity to generate up to 2,233 litres per minute of oxygen. These plants, along with the cryogenic liquid medical oxygen tanks, are expected to be commissioned by end of August.

The institute allocated a fresh area on its campus to the National Highways Authority of India (NHAI) on Monday to set up two oxygen generation plants after the space earmarked earlier was found to be low-lying. The two oxygen generation plants are being set up under the Prime Minister's Citizen Assistance and Relief in Emergency Situation (PM CARES) fund. Each plant will have a capacity to generate 1,000 litres per minute (LPM) oxygen, said Shailendra Kumar Singh, superintending engineer (biomedical), IGIMS.

Earlier, the institute had on July 18 commissioned its first 233 LPM oxygen generation plant, facilitated through Patna MP and former Union minister Ravi Shankar Prasad.

"We have spoken to the authorities in the DRDO and requested them to expedite installation of the two oxygen generation plants. We expect them to be ready within a month," said IGIMS director Dr NR Biswas.

"Besides, one of the two cryogenic tanks of liquid medical oxygen (LMO), each having 20-kilo litre capacity, has been installed. Civil work on the laying of the pipeline is now underway. We expect all oxygen-related work to be complete within a month," added Dr Biswas.

The IGIMS, which has 1,050 in-patient beds, with plans to scale it up by another 1,900 beds, has also put up its 20-kilo litre cryogenic LMO tank and work on laying the pipeline is underway.

"One 20 kilo-litre LMO tank is equivalent to 2,250 D-type cylinders, each having 7,000 litres (approx.) oxygen. We will have three such tanks on our campus, in addition to three PSA oxygen generation plants, making us self-sufficient in medical oxygen," said Singh.

In anticipation of the third wave of Covid-19, one tank each of 20 kilo-litre LMO has also been set up at the Patna Medical College Hospital (PMCH) and the Nalanda Medical College Hospital (NMCH), both in Patna. The Darbhanga Medical College Hospital (DMCH) will be taken up after installation work at the IGIMS is completed, said a health official.

While PMCH, NMCH, IGIMS and DMCH will have two cryogenic LMO tanks each of 20-kilo litre storage capacity, the remaining six state-run medical colleges will have one such tank. All these are expected to be commissioned by August.

https://www.hindustantimes.com/cities/patna-news/igims-to-have-60-kilo-litre-oxygen-storage-capacity-3-generation-plants-101627490748377.html

Defence News

Defence Strategic: National/International

Press Information Bureau
Government of India

Ministry of Defence

Wed, 28 July 2021 5:47PM

Raksha Mantri Shri Rajnath Singh addresses SCO Defence Ministers' meeting in Dushanbe, Tajikistan;

Highlights terrorism as the most serious threat to international peace and security;

Says SCO has collective stake to create a safe and secure region

Highlights of Shri Rajnath Singh's address:

- **SCO completed 20 years; has collective stakes to create a safe and secure region**
- **India completed 500 projects in Afghanistan; gave aid of USD 3 Bn**
- **Peace and Prosperity cannot coexist with terrorism, which is a crime against humanity.**
- **Non-traditional threats like water security, climate change pose challenges as Covid-19 pandemic**
- **Indian Armed Forces and DRDO played a stellar role to counter Covid-19 challenges**
- **India determined to vaccinate 90 crore adult population and to help other friendly countries with vaccine**
- **6.6 crore doses of vaccines provided to 94 countries and United Nations peacekeepers**
- **'Vande Bharat' logistic service helped over 70 lakh stranded people including foreigners move out of distress**
- **India accords high priority to consolidation of trust in security domain within SCO as well as strengthening ties with SCO partners**

Addressing the Shanghai Cooperation Organisation (SCO) Defence Ministers' meeting in Dushanbe, Tajikistan on July 28, 2021Raksha Mantri Shri Rajnath Singh said, Terrorism is the mostserious threat to international peace and security. "Any act of terror and support to such acts, including cross border terrorism, committed by whomsoever, wherever and for whatever motives, is a crime against humanity," he added. The Raksha Mantri reaffirmed India's resolve to fight terrorism in all its forms and manifestations.

Shri Rajnath Singh emphasised, "India accords high priority to the consolidation of trust in the security domain within SCO as well as strengthening ties with SCO partners bilaterally on the basis of equality, mutual respect and understanding." The challenge today is not just one of concepts and norms, but equally of their sincere practice, he added.

Raksha Mantri congratulated Member-States of the SCO on successful completion of 20 years of its existence.He said that though India joined the organisation in 2017, historical and civilisational relations and geographical connects make India inseparable from the SCO.

Stressing on the importance of the regional group, Shri Rajnath Singh said, “The SCO Nations, together, encompass nearly half the human population on our planet. In terms of geography, it covers approximately three fifths of the Eurasian continent.We, therefore, have collective stakes to create a safe, secure and stable region that contributes towards progress and improvement of human development indices of our people and the generations which will follow.”He pointed out that it is in the same spirit India helpspeople of Afghanistan, which is facing violence and devastation over decades. So far India completed 500 projects in Afghanistan and continuing with some more with total development aid of US dollar 3 billion.

Speaking about geo-strategic location of Indiathat makes it both a Eurasian land power and also a stake-holder in the Indo-Pacific, the Raksha Mantri said, “Our intent and aspirations are therefore focused towards prosperity and development of the entire region.We affirm this intent through our national policy of Security and Growth for All in the Region, commonly known by the acronym SAGAR.”Security and Stability are most essential components to create conducive environment for growth and economic development of the region and of our respective Nations, he added.

Reiterating India’s resolve to work within the SCO framework for helping create and maintain a peaceful, secure and stable region, Shri Rajnath Singh said, “India also reiterate commitments to partner with fellow SCO Member-States to develop joint institutional capacities that respect individual national sensitivities and yet generate a spirit of cooperation to create contact and connectivity between people, societies and nations.”

Referring to the Covid-19 pandemic, the Raksha Mantri said “Ithas affected nations, civil societies and citizens in multiple ways. This is a warning sign of how non-traditional security challenges like pandemics, climate change, food security, water security and associated societal disruptions can impact national and international landscape.”

Shri Rajnath Singh said the Armed Forces and the Defence Research and Development Organisation played a stellar role in efforts against Covid-19. He said, “…During the global pandemic, India was able to provide support and assistance to countries around the world. This includes 6.6 crore doses of vaccines to 90 countries, support with medicine, medical consumables and equipment to 150 countries. We may mention the massive ‘Vande Bharat’ logistic service to move over 70 lakh stranded people, including foreigners, mostly by air route, but also by our ships in the Indian Ocean.”

Raksha Mantri assured, “India plans to produce well over 250 crore doses of vaccines between August and the end of 2021.We are determined to vaccinate at least 90 crore adult Indians and to help other friendly countries with vaccine.”

The Raksha Mantri called upon Member-Nations to evolve to meet the needs of its time. He said, “No institution, howsoever important, can remain frozen at the moment of its foundation.The inherent strength of SCO lies in the fact that Member-States participate in cooperation programme at their own pace and as per respective national policies.We are glad that SCO has evolved as truly an international organisation of significance.” Event of today is yet another step towards strengthening stability and security in the region. This will serve to further development of multilateral cooperation within the SCO format, he added.

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पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Wed, 28 July 2021 5:47PM

रक्षा मंत्री श्री राजनाथ सिंह ने ताजिकिस्तान के दुशान्बे में एससीओ रक्षा मंत्रियों की बैठक को संबोधित किया;

आतंकवाद को अंतरराष्ट्रीय शांति और सुरक्षा के लिए सबसे गंभीर खतरा बताया;

श्री राजनाथ सिंह कहा कि एक सुरक्षित क्षेत्र एससीओ के लिए साझा रूप में हितकारी है

श्री राजनाथ सिंह के संबोधन की मुख्य विशेषताएं:

➡ एससीओ ने 20 साल पूरे किए; एक सुरक्षित क्षेत्र बनाना साझा ज़िम्मेदारी

➡ भारत ने अफगानिस्तान में 500 परियोजनाएं पूरी कीं; 3 बिलियन अमेरिकी डॉलर की सहायता दी

➡ मानवता के खिलाफ अपराध आतंकवाद के साथ शांति और समृद्धि नहीं रह सकती

➡ जल सुरक्षा, जलवायु परिवर्तन जैसे गैर-पारंपरिक खतरे कोविड-19 महामारी की तरह चुनौतियां हैं

➡ भारतीय सशस्त्र बलों और डीआरडीओ ने कोविड -19 की चुनौतियों का मुकाबला करने के लिए एक महत्वपूर्ण भूमिका निभाई

➡ भारत ने 90 करोड़ वयस्क आबादी का टीकाकरण करने और अन्य मित्र देशों की टीके के ज़रिए मदद का संकल्प लिया

➡ 94 देशों और संयुक्त राष्ट्र शांतिरक्षकों को टीके की 6.6 करोड़ खुराक उपलब्ध कराई गई

➡ 'वंदे भारत' सेवा ने विदेशियों सहित फंसे हुए 70 लाख से अधिक लोगों को संकट से बाहर निकालने में मदद की

➡ भारत एससीओ के भीतर सुरक्षा डोमेन में विश्वासको मजबूत करने के साथ-साथ एससीओ भागीदारों के साथ संबंधों को मजबूत करने कोउच्च प्राथमिकता देता है

दिनांक 28 जुलाई, 2021 को ताजिकिस्तान के दुशांबे में शंघाईसहयोग संगठन (एससीओ) के रक्षा मंत्रियों की बैठक को संबोधित करते हुए रक्षामंत्री श्री राजनाथ सिंह ने कहा कि आतंकवाद अंतरराष्ट्रीय शांति औरसुरक्षा के लिए सबसे गंभीर खतरा है । उन्होंने कहा, "आतंकवाद का कोई भीकृत्य और इस तरह के कृत्यों को समर्थन, जिसमें सीमा पार आतंकवाद भी शामिलहै, किसी के द्वारा, कहीं भी और किसी भी मकसद से किया जाना मानवता के खिलाफअपराध है ।" रक्षा मंत्री ने आतंकवाद के सभी स्वरूपों से लड़ने के लिएभारत के संकल्प की फिर से पुष्टि की।

श्री राजनाथ सिंह ने जोर देकर कहा, "भारत एससीओ के भीतरसुरक्षा क्षेत्र में विश्वास को मजबूत करने के साथ-साथ समानता, आपसी सम्मानऔर समझ के आधार पर द्विपक्षीय रूप से एससीओ भागीदारों के साथ संबंधों कोमजबूत करने को उच्च प्राथमिकता देता है ।" उन्होंने कहा कि आज चुनौती केवलअवधारणाओं और मानदंडों की नहीं है, बल्कि उनको ईमानदारी से अमलीजामा पहनानेकी भी है।

रक्षा मंत्री ने एससीओ वजूद के 20 साल सफलतापूर्वक पूरे होनेपर सदस्य-देशों को बधाई दी । उन्होंने कहा कि हालांकि भारत 2017 में संगठनमें शामिल हुआ किंतु ऐतिहासिक और सभ्यतागत संबंध और भौगोलिक संपर्क भारत कोएससीओ से अविभाज्य बनाते हैं।

क्षेत्रीय समूह के महत्व पर जोर देते हुए, श्री राजनाथ सिंहने कहा, "एससीओ देशों में एक साथ मिलकर हमारी पृथ्वी की लगभग आधी मानवआबादी रहती है । भूगोल के दृष्टिकोण से यह यूरेशियन महाद्वीप के लगभग तीनबटे पांच हिस्से को कवर करता है । इसलिए हमारे पास एक सुरक्षित और स्थिरक्षेत्र बनाने के लिए सामूहिक हित हैं जो कि हमारे लोगों और आने वालीपीढ़ियों के मानव विकास सूचकांकों की प्रगति और सुधार में योगदान देता है। उन्होंने कहा कि भारत इसी भावना से प्रेरित होकर अफगानिस्तान के लोगोंकी मदद करता है, जो दशकों से हिंसा और तबाही का सामना कर रहा है। अब तकभारत ने अफगानिस्तान में 500 परियोजनाएं पूरी की हैं और 3 बिलियन अमेरिकीडॉलर की कुल विकास सहायता के साथ कुछ और परियोजनाओं को जारी रखे है।

भारत की भू-रणनीतिक स्थिति के बारे में बताते हुए जो इसकोयूरेशियन ज़मीन की शक्ति और साथ ही हिंद-प्रशांत क्षेत्र में एक हितधारकबनाता है, रक्षा मंत्री ने कहा, "इसलिए हमारा इरादा और आकांक्षाएं पूरेक्षेत्र की समृद्धि और विकास की ओर केंद्रित हैं। हम क्षेत्र में सभी केलिए सुरक्षा और विकास की हमारी राष्ट्रीय नीति के माध्यम से इस इरादे कीपुष्टि करें जिसे आमतौर पर संक्षिप्त नाम 'सागर' से जाना जाता है।"उन्होंने आगे कहा कि सुरक्षा और स्थिरता देशों की प्रगति और आर्थिक विकासके लिए अनुकूल वातावरण बनाने के सबसे आवश्यक घटक हैं ।

एक शांतिपूर्ण, सुरक्षित और स्थिर क्षेत्र बनाने और बनाए हुएरखने में मदद करने के लिए एससीओ ढांचे के भीतर काम करने के लिए भारत केसंकल्प को दोहराते हुए श्री राजनाथ सिंह ने कहा, "भारत एससीओ सदस्य-देशोंके साथ साझेदारी करने की प्रतिबद्धताओं को दोहराता है ताकि व्यक्तिगतराष्ट्रीय संवेदनशीलता का सम्मान करने वाली संयुक्त संस्थागत क्षमता विकसितकी जा सके और इसके बीच भी लोगों, समाजों और देशों के बीच संपर्क, सहयोग औरकनेक्टिविटी की भावना पैदा हो पाए।"

कोविड -19 महामारी का उल्लेख करते हुए, रक्षा मंत्री ने कहा, "इसने राष्ट्रों, नागरिक समाजों तथा नागरिकों को कई तरह से प्रभावित कियाहै। यह इस बात की चेतावनी का संकेत है कि महामारी, जलवायु परिवर्तन, खाद्य सुरक्षा, जल सुरक्षा और संबंधित सामाजिक व्यवधान जैसी गैर-पारंपरिकसुरक्षा चुनौतियां राष्ट्रीय और अंतर्राष्ट्रीय जगत को कैसे प्रभावित करसकती हैं।"

श्री राजनाथ सिंह ने कहा कि सशस्त्र बलों और रक्षा अनुसंधानएवं विकास संगठन ने कोविड-19 के खिलाफ प्रयासों में महत्वपूर्ण भूमिकानिभाई है । उन्होंने कहा, "... वैश्विक महामारी के दौरान भारत दुनिया भरके देशों को सहायता प्रदान करने में सक्षम था । इसमें 90 देशों को टीकों की 6.6 करोड़ खुराक, 150 देशों को दवा, चिकित्सा सामग्रियों और उपकरणों केसाथ सहायता शामिल है । हम विदेशियों सहित 70 लाख से अधिक फंसे हुए लोगोंको स्थानांतरित करने के लिए बड़े पैमाने पर ज्यादातर हवाई मार्ग से लेकिन हिंद महासागर में हमारे जहाजों द्वारा भी संचालित 'वंदे भारत' सेवा का उल्लेख कर सकते हैं।

रक्षा मंत्री ने आश्वासन दिया, "भारत अगस्त और 2021 के अंत केबीच टीकों की 250 करोड़ से अधिक खुराक का उत्पादन करने की योजना बना रहाहै । हम कम से कम 90 करोड़ वयस्क भारतीयों का टीकाकरण करने और अन्य मित्रदेशों को वैक्सीन के साथ मदद करने के प्रति दृढ़ हैं ।"

रक्षा मंत्री ने सदस्य-राष्ट्रों से अपने समय की जरूरतों कोपूरा करने के लिए तैयार होने का आह्वान किया । उन्होंने कहा, "कोई भीसंस्थान, चाहे कितना भी महत्वपूर्ण क्यों न हो, अपने निर्माण के समय

जैसाही नहीं बना रह सकता है । एससीओ की अंतर्निहित ताकत इस तथ्य में निहित हैकि सदस्य देश अपनी गति से और संबंधित राष्ट्रीय नीतियों के अनुसार सहयोगकार्यक्रम में भाग लेते हैं । हमें खुशी है कि एससीओ वास्तव में महत्व केएक अंतरराष्ट्रीय संगठन के रूप में आगे बढ़ा है।" आज का आयोजन इस क्षेत्रमें स्थिरता और सुरक्षा को मजबूत करने की दिशा में एक और कदम है । उन्होंने कहा कि यह एससीओ प्रारूप के भीतर बहुपक्षीय सहयोग बढ़ाने के लिएकाम करेगा।

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Press Information Bureau
Government of India

Ministry of Defence

Wed, 28 July 2021 5:05PM

Atmanirbhar Bharat in Defence Sector

Total 41 AoNs worth Rs.86623.55 crore have been accorded to domestic vendors for capital acquisition since May, 2020.

Guidelines issued by the Government for mandatory purchase of items domestically and other action taken by the Government to ensure domestic procurement are enumerated below:-

- Ministry of Defence has notified two "Positive Indigenisation lists" dated 21st August, 2020 and dated 31st May, 2021 of total 209 defence items including Weapons/system/equipment/ammunition along with indicative timelines after which there would be an embargo on their import.
- Department of Defence Production has notified 46 items under the latest Public Procurement Order 2017 notified by Department for Promotion of Industry and Internal Trade (DPIIT), for which there is sufficient local capacity and competition, the procurement of these items has to be done from local suppliers irrespective of the purchase value.
- As per the Public Procurement Policy 2017 Dated 16th September, 2020 which states that "in procurement of all goods, services or works and with estimated value of purchases less than Rs. 200 crore in accordance with Rule 161(IV) of GFR 2017, Global Tender enquiry shall not be issued except with the approval of competent authority as designated by Department of Expenditure".

Further, for the year 2021-22, the allocation for domestic procurement has been enhanced compared to previous year and this year it is about 64.09% of the allocated amount for military modernization (Rs.71438.36 crore).

This information was given by Raksha Rajya Mantri Shri Ajay Bhatt in a written reply to Shri Prof Sougata Ray in Lok Sabha today.

https://pib.gov.in/PressReleasePage.aspx?PRID=1739949

Press Information Bureau
Government of India

Ministry of Defence

Wed, 28 July 2021 5:09PM

Innovations for Defence Excellence (iDEX)

The Department of Defence Production, Ministry of Defence has approved a central sector scheme viz. Innovations for Defence Excellence (iDEX)with budgetary support of Rs. 498.80 crore for the next 5 years from 2021-22 to 2025-26. The objective of the scheme is to provide financial support to nearly 300 Startups/ MSMEs/ individual innovators and about 20 Partner incubators through Defence Innovation Organisation (DIO).

- To avail the grants under the grant mechanism of iDEX i.e. Support for Prototype and Research Kickstart (SPARK), the eligibility is as follows:
- Startups, as defined and recognized by Department of Industrial Policy Promotion (DIPP), now DPIIT, Ministry of Commerce and Industry, Government of India.
- Any Indian company incorporated under the Companies Act 1956/2013, primarily a Micro, Small and Medium Enterprises (MSME) as defined in the MSME Act, 2006.
- Individual innovators are also encouraged to apply (research & academic institutions can use this category to apply).
- To avail the grants as iDEX Partner Incubators, the eligibility is as follows:

    - The applicant incubator should be registered in India as a legal entity in public, private or public–private partnership mode, and should have received establishment or grant support from a Ministry/Department of Government of India in the past.
    - The incubator must have been in operation for a minimum of 3 years before application for affiliation with DIO, and experience of having supported at least 25 startups.
    - It should have successfully graduated at least 5 startups in the past 3 years.
    - It should have at least 25 mentors for startups affiliated with it, at least 5 of them should be relevant to defence or aerospace domain.
    - Experience of having run sector-focused accelerator programs in at least two sectors, with investable startups having come out of each of them.
    - Experience of having partnered with academia and research sector.
    - Extensive corporate, investor, academic, vendor, mentor and government relationships to support start-ups.

The said scheme formulated by Department of Defence Production (DDP) envisages to fund DIO to take up the following activities:

- Setting up and managing the iDEX network in the form of Partner Incubators.
- Communicating with innovators/start-ups/technology centres of MSMEs through the Partner Incubators (PIs).
- Organizing various challenges/hackathons to shortlist potential technologies and entities for defence and aerospace use.
- Interfacing with the Services about key innovative technologies and encouraging their adoption into the defence establishment with suitable assistance.

This information was given by Raksha Rajya Mantri Shri Ajay Bhatt in a written reply to Shri PochaBrahmananda Reddy andShrimatiChinta Anuradha in Lok Sabha today.

THE WEEK

Thu, 29 July 2021

Rajnath Singh-led DAC to finalise deal to buy 30 US made MQ-9 Reaper drones

DAC likely to take final call in its meeting slated for next week

By Pradip R Sagar

India is finalising its deal to acquire 30 US made MQ-9 Reaper or Predator B armed drones for its military. Defence Minister Rajnath Singh-led Defence Acquisition Council (DAC) will take the final call in its meeting scheduled for next week.

Defence Minister Rajnath Singh | Twitter/PIB

Official sources claim that India will be acquiring 30 MQ-9 Reaper—10 each for the three services (Army, Navy and IAF)—from the US worth $3 billion (approximately ₹22,000 crore). Procurement of armed drone will further sharpen India's offensive capabilities as till date Indian military only operates drones for surveillance and reconnaissance missions.

"Earlier, one of the services was not keen to go ahead with the procurement of Predator B armed drones. But, now all issues have been resolved. DAC will take a final call on the issue soon," said a defence official. Moreover, if the deal goes through, it would be the first tri-service procurement since Chief of Defence Staff General Bipin Rawat was appointed to synergise the operational and procurement requirement of the armed forces. Once cleared by the DAC, the cabinet committee on security will give its final approval.

In 2019, Donald Trump-led US administration had approved the sale of Predator-B armed drones to India. If it happens, India will become the first country outside the NATO alliance to get such a weapon from Washington.

Last year, Major General Qasem Soleimani, the commander of powerful Quds Force of the Islamic Revolutionary Guards Corps, was killed along with several officials from Iraqi militia backed by Tehran when an American MQ-9 Reaper drone fired missiles into a convoy that was leaving the airport.

The MQ-9B, manufactured by San Diego-based General Atomics, has an endurance of 48 hours, can carry a payload of about 1,700 kilograms (3,700 pounds) with a range of over 6,000 nautical miles. It comes with nine hard-points, capable of carrying sensors and laser-guided bombs besides air-to-ground missiles, with a maximum payload of two tonnes.

With the weaponised drone, the Indian military will be able to do what NATO forces did in Afghanistan; launching remote control operations and surgical strikes on terrorists' hideouts in Pakistan-occupied Kashmir and engaging with targets on Himalayan borders. It has also given long legs to Indian navy to keep an eye on Chinese warships loitering the southern Indian Ocean.

Last year, Indian navy leased two unarmed MQ-9 Predators amidst tension on border with China in eastern Ladakh. Presently, Indian security agencies use Israeli UAVs, and Defence Research and Development Organisation-developed Netra and Rustom drones.

The US Secretary of State Antony Blinken is already in India to enhance bilateral relations between the two strategic partners. Last week, the US has handed over two MH 60 R multi-role helicopters to Indian navy. The Indian navy is procuring 24 of these Multi Role Helicopters (MRH) manufactured by Lockheed Martin under foreign military sales from the US government at an estimated cost of $2.4 billion. The deal was signed in February 2020, when then US President Donald Trump was on his maiden visit to India.

https://www.theweek.in/news/india/2021/07/28/rajnath-singh-led-dac-to-finalise-deal-to-buy-30-us-made-mq-9-reaper-drones.html

Hindustan Times

Thu, 29 July 2021

IAF formally inducts Rafale jets into 101 squadron of Eastern Air Command

The 101 Squadron is the second IAF squadron to be equipped with the Rafale fighter jets. In September last year, the Rafale aircraft were inducted into the 17 "Golden Arrows" Squadron

The Indian Air Force (IAF) formally inducted the Rafale aircraft into its 101 Squadron of the Eastern Air Command in the presence of Air Chief Marshal R K S Bhadauria at the Hasimara Air Force Station in West Bengal on Wednesday.

Induction ceremony of the second squadron of Rafale fighter aircraft at the Hasimara airbase in Alipurduar on Wednesday. (ANI Photo)

The 101 Squadron is the second IAF squadron to be equipped with the Rafale fighter jets. In September last year, the Rafale aircraft were inducted into the 17 "Golden Arrows" Squadron.

Addressing the personnel at the air force station, Air Chief Marshal Bhadauria said the induction of the Rafale jets at Hasimara was carefully planned, keeping in mind the importance of strengthening the IAF's capability in the eastern sector.

India and China have been locked in a border standoff in eastern Ladakh since May last year. In the northeast, Sikkim and Arunachal Pradesh share borders with China.

The induction event included a fly-past heralding the arrival of the Rafale aircraft at Hasimara, followed by a traditional water-cannon salute, according to a statement issued by the IAF.

India has so far received 26 of the 36 Rafale aircraft it has ordered from French firm Dassault Aviation, Minister of State for Defence Ajay Bhatt informed the Lok Sabha on Wednesday.

In his speech at Hasimara, the IAF chief recalled the glorious history of the 101 Squadron, which earned it the title of "Falcons of Chamb and Akhnoor".

"CAS urged the personnel to combine their zeal and commitment with the unmatched potential of the newly-inducted platform (Rafale)," the IAF said.

Air Chief Marshal Bhadauria said he has no doubt that the squadron would dominate whenever and wherever required, and ensure that the adversary would always be intimidated by its sheer presence.

"The IAF formally inducted Rafale aircraft into No. 101 Squadron at Air Force Station Hasimara in Eastern Air Command on July 28," the statement said.

Air Chief Marshal Bhadauria presided over the induction ceremony. On arrival, he was received by Air Marshal Amit Dev, Air Officer Commanding-in-Chief, Eastern Air Command.

The multi-role Rafale jets, built by French aerospace major Dassault Aviation, are known for air superiority and precision strikes.

The first batch of five Rafale jets arrived in India on July 29, 2020, nearly four years after the country signed an inter-governmental agreement with France to procure 36 aircraft at a cost of ₹59,000 crore. The Rafale jets are India's first major acquisition of fighter planes in 23 years after the Sukhoi jets were imported from Russia.

The Rafale aircraft are capable of carrying a range of potent weapons. European missile maker MBDA's Meteor, a beyond visual range air-to-air missile, and the Scalp cruise missile will be the mainstay of the weapons package of the Rafale jets.

https://www.hindustantimes.com/india-news/iaf-formally-inducts-rafale-jets-into-101-squadron-of-eastern-air-command-101627520213443.html

INDIA TODAY

Thu, 29 July 2021

Delayed due to Covid-19, ISRO to launch Chandrayaan-3 in third quarter of 2022

The Chandrayaan-3 mission has been delayed due to Covid-19 and ISRO is now planning to launch the lunar mission in the third quarter of 2022

New Delhi: Hit by the Coronavirus pandemic, the Indian Space Research Organisation (ISRO) will likely launch the much-awaited Chandrayaan-3 mission to the Moon in the third quarter of 2022. The new timeline was revealed by Minister of State (Independent Charge) Science & Technology Dr Jitendra Singh, who said, "work of Chandrayaan-3 is in progress."

The minister in a written reply to Lok Sabha said that "Work on Chandrayaan-3 involves various processes including finalisation of configuration, subsystems realisation, integration, spacecraft level detailed testing and a number of special tests to evaluate the system performance on earth."

The work on Chandrayaa-2's successor was affected due to the coronavirus pandemic and the impending lockdown. "However, all work that were possible in the work from home mode were taken up even during lockdown periods. Chandrayaan-3 realisation resumed after commencement of the unlock period and is in the matured stage of realization," the Department of Space said in a statement.

Chandrayaan-3 was earlier slated to be launched this year, 2021. However, the Covid-19 lockdown affected several projects of the Indian Space Research Organisation (ISRO) including the lunar mission.

"We are working on it. It is the same configuration like Chandrayaan-2 but it will not have an orbiter. The orbiter launched during Chandrayaan-2 will be used for Chandrayaan-3. With that, we are working on a system and mostly the launch will be next year in 2022," Isro Chief K Sivan had said earlier in February.

However, the space agency had yet to decide a timeline for the launch.

The latest announcement comes on the heels of the second anniversary of the unsuccessful Chandrayaan-2 mission that crash-landed on the far side of the Moon. However, the orbiter is still working and conducting critical observations of not only the lunar surface but also the solar system.

Chandrayaan-3 is critical for ISRO as it will demonstrate India's capabilities to make landings for further interplanetary missions.

The Chandrayaan-3 takes cues from the first Chandrayaan mission launched in October 2008 that made major discoveries including finding evidence of water on the lunar surface.

https://www.indiatoday.in/science/story/chandrayaan-3-mission-launch-isro-department-of-space-moon-k-sivan-1833626-2021-07-28

Thu, 29 July 2021

The thinnest CD-RW: Atomic-scale data storage possible

Using a focused laser beam, scientists can manipulate properties of nanomaterials, thus 'writing' information onto monolayer materials. By this means, the thinnest light disk at atomic level was demonstrated.

Credit: Pixabay/CC0 Public Domain

The bottleneck in atomic-scale data storage area may be broken by a simple technique, thanks to recent innovative studies conducted by scientists from Nanjing Normal University (NJNU) and Southeast University (SEU).

Through a simple, efficient and low-cost technique involving the focused laser beam and ozone treatment, the NJNU and SEU research teams, leading by Prof. Hongwei Liu, Prof. Junpeng Lu and Prof. Zhenhua Ni demonstrated that the photoluminescence (PL) emission of WS_2 monolayers can be controlled and modified, and consequently, it works as the thinnest light disk with rewritable data storage and encryption capability.

"In our childhood, most of us are likely to have experience of focusing sunlight onto a piece of paper by magnifying glass and trying to ignite the paper. The scorched spot on paper is a sort of data recording at the moment. Instead of focusing sunlight, we focus laser beam on modified atomic level materials and study effects of the focused laser beam on PL emissions of the materials," said Prof. Lu.

Data storage and encryption: information 'drawn' on ozone treated WS_2 films

Owing to its advantage of direct visibility, PL is usually considered as an ideal technology in terms of encryption and decryption data storage. For a straightforward and effective encryption data storage method, the following aspects are desired: (i) direct writing (fast writing-in speed); (ii) high security level; (iii) large data storage capacity; (iv) visual decryption reading; (v) erasing capability.

To address these technological challenges, researchers demonstrate the thinnest light disk with encryption functionality.

The write-through and erasable encryption are realized on WS_2 monolayers. The writing-in and reading-out of information are enabled by the directly controlling of fluorescence contrast of WS_2 monolayers. Ozone and focused laser beam scanning are employed to on-demand manipulate PL emission and realize encryption.

With this simple and low cost approach, the scientists were able to use the focused laser beam to selectively 'write' information onto any region of the film to storage encrypted data. In addition, the written data are erasable, making the monolayer light disk reusable.

Interestingly, the evolution of PL emission with different writing laser powers could be used to assign different gray levels. The 16 gray levels assignment indicates a typical triangle WS_2 monolayer with the side length of 60 μm can storage ~1 KB data. Owing the high spatial resolution and power sensitivity, the storage capacity within 1 nm thickness could be up to ~62.5 MB/cm^2 and the writing speed can reach ~6.25 MB/s. This technology will be beneficial to extend the optical encryption into low dimensional regime, offering an unexpected information-secure solution to exchange data.

This innovation was first published online in the journal *Advanced Functional Materials* on 24 June 2021.

The fast-growing information field demands higher security and larger storage capability. To develop light disk that cater to the industry standard, The research teams from NJNU and SEU will extend the versatile focused laser beam technique to wafer-scale monolayer material. In addition, they will look into further improving the storge capability of light disk via normal direction stacking.

More information: Weiwei Zhao et al, The Thinnest Light Disk: Rewritable Data Storage and Encryption on WS_2 Monolayers, *Advanced Functional Materials* (2021). DOI: 10.1002/adfm.202103140

Journal information: *Advanced Functional Materials*

https://phys.org/news/2021-07-thinnest-cd-rw-atomic-scale-storage.html

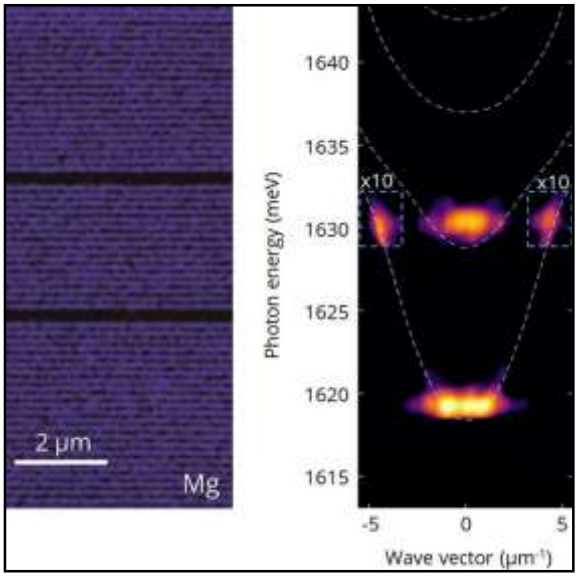
Thu, 29 July 2021

Non-linear effects in coupled optical microcavities

Scientists from the Faculty of Physics of the University of Warsaw have demonstrated exciton-polariton lasing and parametric scattering of exciton-polaritons in a system of coupled optical microcavities. The results have been published in the prestigious journal *Nanophotonics*.

Exciton-polaritons are quasiparticles formed by a strong coupling between excitons and photons in a semiconductor. Their bosonic nature and non-linear interactions allow the observation of fascinating phenomena such as Bose-Einstein condensation of polaritons and polariton lasing, which, unlike typical lasering, occurs without occupation inversion.

Coupled microcavity systems, such as those based on two coupled optical microcavities, offer a promising multi-level platform for basic research and practical applications. The unique structure consisting of several dozen of layers with the precisely defined thickness (each with an accuracy of a few nanometers) was fabricated in the MBE laboratory at the Faculty of Physics, University of Warsaw.



On the left: a spatial cross-section of the studied structure. Two optical microcavities (broad black stripes) are visible, surrounded by a multilayer Bragg mirrors. The image shows the spatial distribution of magnesium. It was obtained in a transmission electron microscope in the measurement of energy dispersion X-ray spectroscopy. On the right: angularly resolved emission spectrum of a system of two coupled optical microcavities recorded for excitation power above the polariton lasing threshold. The white lines represent the calculated polariton levels. Parametric polariton scattering is visible as bright points inside the blue rectangles. Credit: K. Sobczak, CNBCh UW, K. Sawicki, Faculty of Physics UW

"In the presented work, we study non-linear effects in a system of two coupled optical microcavities. Bose-Einstein condensation of polaritons and polariton lasing occur at the two lowest energy levels of an overall four-level system. This is a surprising result in the context of what has previously been observed in single microcavities, where condensation took place in the system's ground state. Emission dynamics measurements have shown that in the present case the condensates of different energies share the same lasing threshold, but do not appear simultaneously, i.e. they form and disappear subsequently, one by one. Moreover, the transition to the condensate state is accompanied by an energy-degenerate parametric scattering of polaritons, i.e. the one in which the state of the crystal is preserved before and after the scattering process," explains Krzysztof Sawicki.

In previous studies on coupled microcavities, parametric scattering was obtained using strictly resonant excitation. The non-resonant excitation used in the present work enables spectral separation of the signal from the excitation laser, which is a promising result from the point of view of implementing sources of entangled photons based on polaritons.

Previously, a coupled microcavity system was used to demonstrate energy transfer over 2 micrometers, mediated by polariton states. This is a record distance taking into account the typical nanometer scale of interaction between excitons in a semiconductor.

"We expect our results to open the way to the research on new types of non-linear effects in multi-level polariton systems. Our work is essential for such rapidly developing fields as, for example, all-optical quantum computing, since the non-linear interactions in a multi-level system may enable the implementation of logic systems based on polaritons," adds Jan Suffczynski.

More information: Krzysztof Sawicki et al, Polariton lasing and energy-degenerate parametric scattering in non-resonantly driven coupled planar microcavities, *Nanophotonics* (2021). DOI: 10.1515/nanoph-2021-0079

https://phys.org/news/2021-07-non-linear-effects-coupled-optical-microcavities.html

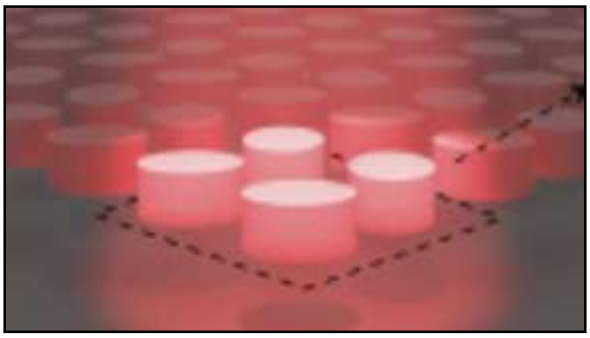
PHYS.ORG

Thu, 29 July 2021

Machine-learning method to find optimal solutions in extremely large design spaces

By Ken Kingery

Electrical engineers at Duke University have devised a new method for solving difficult design problems with many potential solutions in a large design space using machine learning. Dubbed the "neural-adjoint method," the approach successfully unearths an optimized design for an electromagnetic communications device and could also be used for many other design challenges ranging from biomedical imaging to holography.



A new machine learning approach can help researchers solve problems such as figuring out the best sizes of cylinders to capture electromagnetic energy. Credit: Duke University School of Nursing

The research appeared online February 24 in the journal *Optics Express*, titled "Neural-adjoint method for the inverse design of all-dielectric metasurfaces."

The quandary being addressed by the new machine learning method is solving inverse problems, meaning researchers know the result they want but aren't sure the best way to achieve it. Within this type of challenge is a class called ill-posed inverse problems, which means there's an infinite number of solutions with no guidance as to which might be the best.

"If given two numbers to add, you can get a direct and simple solution," explained Willie Padilla, professor of electrical and computer engineering at Duke. "But if I say to give me two real numbers that add up to three, there's an infinite set of numbers that could be the answer with zero understanding if the correct answer has been chosen. Flipping this simple task shows just how challenging an ill-posed inverse problem can be."

In the new research, the specific task Padilla is seeking to solve is finding the best design for a dielectric (metal-free) metamaterial that produces a specific electromagnetic response. Metamaterials are synthetic materials composed of many individual engineered features, which together produce properties not found in nature. They achieve this through their structure rather

than their chemistry. In Padilla's dielectric metamaterial experiment, he uses a large sheet built from individual two-by-two grids of silicon cylinders resembling short, square Legos.

Calculating how the electromagnetic effects of an identical set of cylinders interact with one another is a straightforward process that can be done by commercial software. But working out the ill-posed inverse problem of which geometry will best produce a desired set of properties is a much more difficult proposition. Because each cylinder creates an electromagnetic field that extends beyond its physical boundaries, they interact with one another in an unpredictable, nonlinear way.

"If you try to build a desired response by combining the electromagnetic effects produced by each individual cylinder, you're going to get a complicated map of many high and low peaks that is not simply a sum of their parts," said Professor Padilla. "It's a huge geometrical parameter space and you're completely blind—there's no indication of which way to go."

Padilla's new machine learning approach to navigating this complex design space starts by training a deep neural network with 60,000 simulations of different designs and the electromagnetic properties they produce. Even taking 14 geometric parameters into account, the machine learning algorithm learned the function that connects the complex geometry with the electromagnetic result.

At this point, the deep neural network could provide researchers with an answer to an inverse question of finding a geometry that can produce a desired response. But with 1.04 trillion potential solutions, it would take the neural network over three years to find an answer.

"To my knowledge, this is the largest photonics problem of geometric space that anyone has worked on," said Padilla. "If you tried to solve it with a normal computer algorithm, it'd take a 600million years. The deep neural network only sampled 0.00000575% of the design space, but it learned the function anyway."

While an impressive feat, it is the second step to this process that is truly novel. Although the researchers don't know exactly what the function that the deep neural network came up with actually looks like, they can use it to work toward an optimal answer.

The new neural-adjoint method works by starting at 16,000 random points and calculating how good of a solution each is. It then allows each to move toward a better solution—a process called gradient descent. By repeating this process multiple times, the algorithm works its way to locally optimized solutions. Crucially, the researchers also set minimum and maximum boundaries based on their knowledge of the space that the machine learning is accurate within, which stopped the algorithm from getting too crazy with its solutions.

After 300 iterations, the program looks at the 16,000 locally optimal solutions it found and chooses the best option. It also indicates if there might be a boundary set on a parameter that might enable a better solution if it were expanded.

"In doing this research, we saw all of our best solutions jammed up against the maximum height we had set for the cylinders," said Padilla. "We were limiting ourselves but didn't know it. So we extended the height, did even more simulations, and indeed found a better solution."

Applied to metamaterials, Padilla says this method could help develop flat communications antennas for the sides of buildings that can quickly reconfigure themselves to better reach nearby users. But he says it could also be used in a wide range of applications that collect information from electromagnetic waves. For example, interpreting X-rays or magnetic waves in medical imaging devices or developing computer-generated holograms.

More information: Yang Deng et al, Neural-adjoint method for the inverse design of all-dielectric metasurfaces, *Optics Express* (2021). DOI: 10.1364/OE.419138

Journal information: *Optics Express*

https://phys.org/news/2021-07-machine-learning-method-optimal-solutions-extremely.html

mint

Thu, 29 July 2021

Abnormal covid-19 antibodies may cause fatal blood clots in severe cases: study

By Neetu Chandra Sharma

- ***The study published in the journal Blood found that inflammation and blood clotting seen in very severe cases of covid-19 may be caused by the antibodies sent to fight the disease activating unnecessary platelet activity in the lungs***

New Delhi: Antibodies produced to protect against covid-19 may trigger increased function of platelets, which may be causing fatal blood clots in patients with severe disease, research done by University of Reading England has revealed.

The team found that the small sugars found on the surface of antibodies produced to fight the coronavirus's spike protein, taken from people with severe covid-19 infections, were different from antibodies separated from healthy individuals, and when those cloned antibodies were introduced in a lab to blood cells taken from healthy donors, there was an observed increase in platelet activity.

Platelets are small cells found in blood which form clots to stop or prevent bleeding, but where platelets don't function properly this can lead to serious health concerns such as strokes and heart attacks. The study published in the journal *Blood* found that inflammation and blood clotting seen in very severe cases of covid-19 may be caused by the antibodies sent to fight the disease activating unnecessary platelet activity in the lungs.

The study took antibodies produced to fight the coronavirus's spike protein, from people with severe covid-19 infections, and cloned them in a lab. The team found that the small sugars found on the surface of these antibodies were different from antibodies separated from healthy individuals, and when those cloned antibodies were introduced in a lab to blood cells taken from healthy donors, there was an observed increase in platelet activity.

The study team also found that it was possible to reduce or stop platelets from responding in this way in the laboratory by treating blood with active ingredients from drugs known to either inhibit platelet function or immune responses. The findings suggest that it may be possible for drugs that are currently used to treat immune system problems to reduce or stop the cells from producing an exaggerated platelet response.

A trial led by Imperial College London and Imperial College Healthcare NHS Trust—called MATIS—is already testing these drugs in clinical trials with patients at hospital sites across the UK to see whether they will reduce serious clotting for hospitalized covid-19 patients.

The lab-based study of human cells provides key evidence to support the scientific basis for the MATIS trial, and, while no result has been reported yet from this clinical trial, the two teams will continue to work closely together as the clinical trial develops. "Until now, we have only had assumptions about why platelets involved in clotting were being activated during covid-19 infection. One way to think of what happens is that the immune response that is designed to protect you from the infection in some cases, particularly in severely ill patients, actually causes more damage. In this case, the antibodies produced to stop covid-19 from spreading, trigger infected

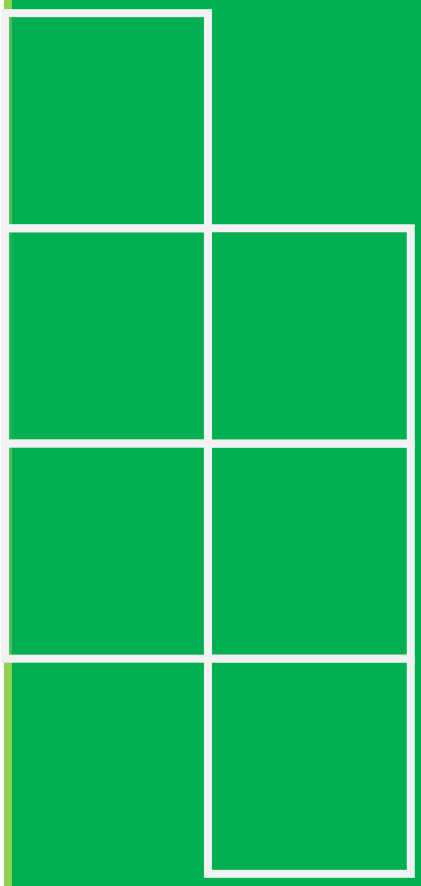
cells to induce platelet activity that causes clotting even though there is no wound that needs healing," Professor Jon Gibbins, director of the Institute for Cardiovascular and Metabolic Research at the University of Reading said.

“We are particularly excited because our studies of platelets in the laboratory establishes important mechanisms that explain how and why dangerous blood clots may occur in severely ill covid-19 patients, and importantly, also provides clues as to how this may be prevented," Gibbins said.

Co-author Nichola Cooper, reader at Imperial College London and consultant haematologist at Imperial College Healthcare NHS Trust, who also designed and leads the MATIS trial said: “Early on in the covid-19 pandemic it was clear that the infection was causing an overwhelming immune response, including blood clotting, and that many of the more severe cases and deaths were related to this.

“Having been involved in early research around blood clotting related to inflammation, it occurred to me that the drugs we already use for other disorders could be easily accessible treatments for covid-19. We are yet to see results from the MATIS trial, so we do not yet know how these drugs will work in patients, but our hope is that we can both inhibit the inflammatory response and prevent severe disease and blood clots. It is exciting to see our collaboration with Reading backing our theory already and providing a solid scientific basis for clinical trials."

https://www.livemint.com/news/india/abnormal-covid-19-antibodies-may-cause-fatal-blood-clots-in-severe-cases-study-11627467470165.html



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