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Newspapers Clippings

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Sat, 07 Nov 2020

DRDO Chief appeals COVID patients to avail free medical care at agency-run hospitals

New Delhi, Nov 07 (ANI): Defence Research and Development Organisation (DRDO) Chairman G Satheesh Reddy appealed COVID-19 patients to get treated in agency-run hospitals in free of cost. Chairman Reddy said, “DRDO has established COVID hospitals in Delhi, Patna and Muzaffarpur; 1000-bedded hospital with 250 ICU beds in Delhi, and 500-bedded hospitals with 125 ICU beds in Patna and Muzaffarpur. Patients are treated free of cost at these hospitals. I request all the affected people to come here and get well soon.

https://in.news.yahoo.com/drdo-chief-appeals-covid-patients-091549290.html

livemint

Sat, 07 Nov 2020

DRDO hospital in Delhi starts taking COVID patients for free treatment

Presently, around 400 patients are undergoing treatment at the DRDO-built hospital, with the rest of the beds vacant

As cases in the national capital surge once again, Sardar Vallabhbhai Patel COVID Hospital here on Ulan Batar Marg that offers free treatment has started taking coronavirus patients.

Presently, around 400 patients are undergoing treatment at the DRDO-built hospital, with the rest of the beds vacant.

DRDO Chairman Dr G Satheesh Reddy said beds are available here. "People are not being charged for any services, including the food, here."

Spread on over 25,000 sq m of the Indian Air Force land, there are 250 ventilators in a 100-bed intensive care unit and 150-bed high dependency unit. All 1,000 beds have an oxygen facility. Significantly, this hospital in Delhi Cantonment looks after only moderate to severe patients.

Col. Nikahat Jahan, an anaesthesiologist and intensivist (from Pune), told ANI they have seen a surge in cases in the last few days. "Earlier, we were admitting 20/40 patients but now for the last five days, we have been admitting double the number."

"Strict protocols are being followed while dealing with the patients, maintaining each other's safety. We are very strict about our infection prevention measures," said Col Jahan.

The temporary hospital was built by the civil works and estate directorate of DRDO in just 12 days in compliance with the guidelines issued by the World Health Organization.

With 83 per cent recovery rate, the 1000-bed hospital so far has helped 1,900 people recover since its first admission on July 12.

(This story has been published from a wire agency feed without modifications to the text. Only the headline has been changed.)

https://www.livemint.com/news/india/drdo-hospital-in-delhi-starts-taking-covid-patients-for-free-treatment-11604712650395.html

जागरण

Sat, 07 Nov 2020

दिल्ली में मिले रिकॉड मामले, डीआरडीओ के अस्पताल ने शुरू किया कोरोना मरीजों का नि:शुल्क इलाज

दिल्ली में DRDO का सरदार वल्लभ भाई पटेल कोविड-19 अस्पताल कोरोना संक्रमितों का नि:शुल्क इलाज कर रहा है।

By Krishna Bihari Singh

नई दिल्ली: दिल्ली में शुक्रवार को कोरोना के रिकॉर्ड 7178 नए मामले सामने आए। यही नहीं राष्ट्रीय राजधानी में 64 संक्रमितों की मौत भी हो गई। इस बीच रक्षा अनुसंधान व विकास संगठन (Defence Research and Development Organisation यानी DRDO) ने की ओर से दिल्ली में बनाए गए सरदार वल्लभ भाई पटेल कोविड-19 अस्पताल ने एक सकारात्मक पहल की है। अस्पताल ने कोरोना संक्रमितों का नि:शुल्क इलाज का भरोसा देते हुए इन्हें भर्ती करना शुरू किया है।

समाचार एजेंसी एएनआइ के मुताबिक, मौजूदा वक़्त में यहां लगभग 400 मरीजों का इलाज किया जा रहा है। डीआरडीओ अध्यक्ष जी सतीश रेड्डी ने बताया कि मरीजों के लिए यहां पर्याप्त बेड उपलब्ध हैं। यहां भर्ती मरीजों से किसी भी सेवा के लिए कोई भी शुल्क नहीं लिया जा रहा है। मरीजों को नि:शुल्क भोजन भी दिया जा रहा है। बता दें कि दिल्ली में कोरोना संक्रमण के बढ़ते मामलों पर लगाम के लिए डीआरडीओ ने इस अस्पताल को बनाया था।

दिल्ली में DRDO का सरदार वल्लभ भाई पटेल कोविड-19 अस्पताल कोरोना संक्रमितों का नि:शुल्क इलाज कर रहा है।

डीआरडीओ ने इस अस्पताल को 12 दिनों के भीतर बनाया था। केंद्रीय गृह मंत्री अमित शाह (Amit Shah) और रक्षा मंत्री राजनाथ सिंह (RajNath Singh) ने इसकी शुरुआत के मौके पर दौरा करके व्यवस्थाओं का जायजा लिया था। गृह मंत्रालय, टाटा संस इंडस्ट्रीज और कई अन्य संगठनों ने इस अस्पताल को बनाने में सहयोग किया था। 1000 बिस्तरों वाले इस अस्पताल में 250 से अधिक ICU यूनिट्स उपलब्ध कराए गए हैं।

समाचार एजेंसी एएनआइ के मुताबिक, यहां से 2300 कोरोना मरीज स्वस्थ होकर घर लौट चुके हैं। इस बीच राष्ट्रीय राजधानी दिल्ली में संक्रमण दर भी 12.19 फीसद तक पहुंच गई है। हालांकि पिछले 24 घंटे में कोरोना संक्रमित 6121 मरीज ठीक भी हुए हैं। आधिकारिक आंकड़े बताते हैं कि दिल्ली में कोरोना के अब तक कुल चार लाख 23 हजार 831 मामले सामने आ चुके हैं। तीन लाख 77 हजार 276 मरीज कोरोना संक्रमण को हरा चुके हैं। दिल्ली में अब तक 6833 लोगों की संक्रमण से मौत हो गई है।

https://m.jagran.com/news/national-ncr-sardar-vallabhbhai-patel-covid-hospital-of-drdo-start-taking-covid-patients-for-free-treatment-21035759.html

Sat, 07 Nov 2020

First webinar with DRDO in country for new entrepreuners

Bhopal: Minister of Micro, Small and Medium Enterprises Shri Om Prakash Sakhalecha has called upon people wishing to set up small industries in Madhya Pradesh, in view of the available infrastructure and industry friendly environment in Madhya Pradesh. Minister Shri Sakhlecha was addressing the participants in a webinar held with DRDO. Member of Parliament Shri Vinay Sahastrabuddhe, Secretary of Ministry of Defense Dr. Satish Reddy, Secretary MSME Shri Vivek Porwal, Scientist and Director of DRDO Shri Mayank Dwivedi, Director of DRDE Dr. D.K. Dubey shared their views in the webinar.

First Webinar in Country

At the conclusion of the webinar, Minister Shri Sakhalecha said that Madhya Pradesh is the first state in the country, which is holding a webinar with DRDO.While discussion with the new entrepreneurs, he told them that the infrastructure in Madhya Pradesh is better than other states, low cost and quality electricity, manpower, smooth rail and road transport, resources, water, everything and even more industry friendly environment is available here.He said that industrial investment in defense sector also develops a sense of service to the country. He said that Madhya Pradesh and the country will become Atmanirbhar with the coordination of science technology and MSME.

Webinar for funding of New Entrepreuners on 17

MSME Minister Shri Sakhlecha underlined the financial problems of the entrepreneurs. He informed that on November 17, a webinar will be held with the Joint Secretary Finance of Government of India and General Manager of SIDBI. He appealed to the entrepreneurs that they must attend this webinar. For this concept of the webinar, Minister Shri Sakhalecha expressed gratitude to Shri Jayant Sahastrabuddhe, the President of Vigyan Bharati.

Earlier M.P. Shri Vinay Sahastrabuddhe said that various technologies have been developed in the national laboratories of our country, but no efforts have been made to reach the entrepreneurs. Coordination and inter-regional exchange of useful technologies, developed by DRDO, CSIR, BARC, IIT etc. will help in efforts to make the country Atmanirbhar, he added.

Secretary, Defense Research and Development Organization (DRDO), Dr. G. Satish Reddy, said that our laboratory has developed technology in various fields by connecting science to industries. Dr. Reddy informed that there are 47 laboratories of Defense Research and Development Organization (DRDO) spread across the country. There is a DRDE laboratory in Gwalior, Madhya Pradesh. Secretary MSME Shri Vivek Porwal said that this event is a relevant and innovative initiative for new entrepreneurs.

Director, DIITM Dr. Mayank Dwivedi said that our laboratory has conducted research from Aeronautical to Life Sciences and Missile to Electronics and Communication sector. Currently we have reached the stage of transfer of technology. DRDO has developed research and techniques in the field of ICU ventilators and nutrition. He said that a list of all the 108 items developed is available on their website and there is much more information available for the new entrepreneur. Director, DRDE, Gwalior Dr. D.K. Dubey, gave detailed information of the technology developed by their laboratories to be provided to the industries. Director General of Council Shri Anil Kothari also participated in the discussion. New entrepreneurs can also view this webinar on the website of Science and Technology and MSME.

https://indiaeducationdiary.in/first-webinar-with-drdo-in-country-for-new-entrepreuners/

Defence News

Defence Strategic: National/International

THE HINDU

Sun, 08 Nov 2020

Armed forces must be ready to combat hybrid threats: IAF Chief

He also hailed the creation of the post of Chief of Defence Staff (CDS) and Department of Military Affairs (DMA) as the beginning of the "most historic phase of higher defence reforms" in the country

Pune: Air Chief Marshal Rakesh Kumar Singh Bhadauria on Saturday said that today's battle-space is "highly complex and multi-dimensional" with unpredictable security scenarios, and the armed forces have to be prepared for hybrid threats emanating from multiple fronts.

He also hailed the creation of the post of Chief of Defence Staff (CDS) and Department of Military Affairs (DMA) as the beginning of the "most historic phase of higher defence reforms" in the country.

Indian Air Force (IAF) chief Rakesh Kumar Singh Bhadauria.

Mr. Bhadauria was addressing the cadets of the National Defence Academy (NDA) here after reviewing the passing out parade of its 139th course.

"The NDA is not just the cradle of leadership, but a true cradle of jointmanship. The vast experience of joint training at the NDA needs to be carried forward to the respective academies," he said.

"Today's battle-space is highly complex and multi- dimensional with unpredictable security scenarios and high operational tempo. In the battle-space, operational response and demand will be an integrated synergistic approach to all operations," he added.

"Therefore, bonds of friendship that you have forged here, with your course-mates, with your squadron-mates, need to continue throughout your life, as you go into your service career and

should translate always into better synergy at every stage of your career," Mr. Bhadauria advised the cadets.

"The appointment of the Chief of Defence Staff (CDS) and formation of the Department of Military Affairs (DMA) marks the beginning of the most historic phase of higher defence reforms in our country," he said.

"As budding military professionals, you should begin to understand that geopolitical churnings around the world have a direct bearing on the security environment in our neighbourhood," the IAF chief said.

"Our armed forces have to be prepared for hybrid threats emanating from multiple fronts. This mandates very high levels of knowledge, dedication, commitment and sacrifice and leadership at all levels at all times. This is what each service and the nation would expect from you," he added.

The convocation ceremony of 139th NDA course was held the academy on Friday. A total of 217 cadets- 49 from science stream, 113 from Computer Science stream and 55 from Arts stream- were conferred the degree of Jawaharlal Nehru University (JNU), an NDA official said.

https://www.thehindu.com/news/national/armed-forces-must-be-ready-to-combat-hybrid-threats-iaf-chief/article33046242.ece

The Indian EXPRESS

Sat, 07 Nov 2020

Army nod to Uttarakhand non-Gorkhas in Gorkha Rifles

Till now, only Nepal-Domiciled Gorkhas and Indian-Domiciled Gorkhas were recruited into Gorkha Rifles regiments

By Man Aman Singh Chhina

In a major policy decision, the Army Headquarters has sanctioned the recruitment of non-Gorkha personnel from Uttarakhand into select Gorkha Rifles (GR) regiments. The move, which shall come into effect from the next recruitment cycle, will make eligible Garhwali and Kumaoni youth from Uttarakhand to join GR.

At present, the Indian Army has approximately 40 GR battalions.

Till now, only Nepal-Domiciled Gorkhas (NDG) and Indian-Domiciled Gorkhas (IDG) were recruited into GR regiments, with a ratio of 60-40 maintained between Nepalese and Indian troops in a GR battalion. However, an all-Indian Gorkha battalion was also raised in a regiment a few years back.

Highly-placed sources informed The Indian Express that the approval to induct non-Gorkha personnel has been given for three of the seven GR regiments. (File)

Highly-placed sources informed The Indian Express that the approval to induct non-Gorkha personnel has been given for three of the seven GR regiments.

When contacted, a senior officer in Army Headquarters confirmed the development. "There is no shortage of recruits coming from Nepal in the various GR battalions. However, there has been a shortfall of Indian Gorkha recruits for some units and therefore this measure has been adopted to make up the numbers. At present, this induction of non-Gorkhas has been limited to the next two years and thereafter a call will be taken after seeing the numbers of Indian Gorkhas volunteering to join up," said the officer.

A 1947 tripartite agreement between Nepal, India and the UK allows India Army and the British Army to recruit Gorkha soldiers from Nepal. Under this agreement, of the ten GR regiments at the time, six went to India and four were retained by the UK.

Thus, the Indian Army kept 1, 3, 4, 5, 8, and 9 GR and subsequently raised a seventh regiment, 11 GR. The British Army retained 2, 6, 7 and 10 GR.

Apart from Infantry, Gorkhas are also recruited in an all-Gorkha artillery regiment and a Mechanised Infantry battalion whose origins lie in Gorkha Rifles. Gorkhas also serve in Rashtriya Rifles battalions in Jammu and Kashmir.

Nepal Foreign Minister Pradeep Kumar Gyawali had recently termed the Gorkha recruitment a legacy of the past and had called the 1947 tripartite agreement redundant. The remarks had come in the backdrop of the Kalapani dispute between India and Nepal.

A senior retired Gorkha Rifles officer who did not want to be quoted called the development "unfortunate". "Maybe the government does not want to fill the shortfall of Indian Gorkhas by recruiting more Gorkhas from Nepal, given the strain in relations," he said.

The British raised the first Gorkha regiment in 1815 at Subathu, Himachal Pradesh. However, prior to that, Maharaja Ranjit Singh had also recruited Gorkhas after a conflict with the Gorkha Army in Kangra in 1809.

https://indianexpress.com/article/india/army-nod-to-uttarakhand-non-gorkhas-in-gorkha-rifles-6984532/

THE HINDU

Sat, 07 Nov 2020

Army Chief Naravane meets Nepal PM Oli, assures further defence cooperation

Gen. M M Naravane is on a three-day visit to the neighbouring country to reset bilateral ties following last year's border row

By Dinakar Peri

Army Chief Gen. Manoj Naravane on Friday called on Prime Minister of Nepal K.P. Sharma Oli and reaffirmed that he would work to further strengthen the defence cooperation between the two countries, Indian Embassy in Kathmandu said.

Chief of Army Staff General MM Naravane during a meeting with Prime Minister of Nepal K P Sharma Oli, in Kathmandu. | Photo Credit: PTI

The visit is significant as General Naravane is the highest ranking Indian dignitary to meet the Nepalese leadership in the backdrop of the Kalapani territorial dispute. Nepal had protested against the inauguration of new road infrastructure in the Lipulekh-Kalapani area on May 8. The disputed area is of strategic significance to India as it allows India to access the Tibetan plateau.

Earlier in the day, Gen. Naravane visited the Nepali Army Command and Staff College and addressed the students and staff. Before concluding his three-day tour, he visited the Indian Embassy where he was briefed about the welfare activities being carried out for roughly over 2.3 lakh Indian Army veterans and their families in Nepal.

During the visit, Gen. Naravane also presented a welfare grant to Havildar Dil Bahadur Chhettri (Retd), a winner of Maha Vir Chakra (MVC), the second highest gallantry award of India.

Hav. Chettri was was born in August 1950 in Gharti Gaon in Matta Dang district of Nepal and enrolled into 4/5 Gorkha Rifles (Frontier Force) of Indian Army on August 21, 1968. He was awarded MVC for his conspicuous gallantry in capturing a fortified Medium Machine Gun (MMG)

during the 1971 war. However, he had to quit service on his own request due to personal reasons before even reaching the requisite pensionable service and was discharged from Service on April 08, 1976," the Army said in a statement.

"Since then he has been living in a small remote village of Banke district in Nepal and had no major income source and was surviving on his gallantry award allowance. His case recently came to notice when one senior officer of his unit informed Defence Wing about it," the statement said.

Contact was established with him and a total amount of ₹10 lakhs was approved as a welfare measure. During an ex servicemen rally at Butwal, Nepal on November 21, 2019, he was felicitated with a cheque of ₹5 lakhs and the balance was handed over by Gen. Naravane on Friday.
https://www.thehindu.com/news/national/army-chief-naravane-meets-nepal-pm-oli-assures-further-defence-cooperation/article33041287.ece

अमर उजाला

Sat, 07 Nov 2020

मालाबार युद्धाभ्यास: विक्रमादित्य और अमेरिकी सुपरकैरियर निमित्ज गोवा के तट पर करेंगे अभ्यास

नई दिल्ली: भारत और चीन के बीच मई की शुरुआत से सीमा पर तनाव जारी है। इसी बीच भारत, अमेरिका, ऑस्ट्रेलिया और जापान मिलकर गोवा के तट पर 17 से 20 नवंबर तक मालाबार नौसेना युद्धाभ्यास करेंगे। इस अभ्यास में भारतीय नौसेना का जहाज विक्रमादित्य और अमेरिकी सुपरकैरियर निमित्ज के साथ ऑस्ट्रेलियाई और जापानी नौसेना के दो विध्वंसक हिस्सा लेंगे।

मालाबार नौसेना अभ्यास 2020 - फोटो : Twitter: @indiannavy

विक्रमादित्य पर मिग-29के और निमित्ज पर F-18 लड़ाकू विमान भी युद्धाभ्यास में हिस्सा लेंगे। इसके अलावा दो अन्य देश जो भारत और अमेरिका की तरह क्वाड का हिस्सा हैं वो डोमेन बहु-संचालन क्षमता को मजबूत करेंगे। इस युद्धाभ्यास के जरिए चारों देशों को एक-दूसरे की नौसेनाओं, कमांडरों और कर्मियों के प्रशिक्षण के लोकाचार और स्तर को समझने में मदद मिलेगी।

यह अभ्यास फारस की खाड़ी और अरब सागर के बीच के क्षेत्र में गश्त करने वाले कम से कम 70 विदेशी युद्धपोतों के साथ काफी भीड़भाड़ वाले वातावरण में होगा। चीन की पीपुल्स लिबरेशन आर्मी (पीएलए) की नौसेना के युद्धपोत आसपास के क्षेत्र में नहीं हैं, लेकिन बहुत दूर भी नहीं हैं। वे संभवतः अदन की खाड़ी से समुद्री डाकू विरोधी अभियान चला रहे हैं।

शीर्ष नौसैनिक कमांडरों के अनुसार, भारतीय नौसेना पूरी तरह से पूर्वी और पश्चिमी समुद्री तट पर तैनात है और यदि पूर्वी लद्दाख क्षेत्र में स्थिति बदतर हो जाती है तो आकस्मिक स्थिति के लिए भी तैयार है। विश्लेषकों का कहना है कि यह स्पष्ट है कि नेविगेशन के लिए संचार के समुद्री लेन को खुला रखने के लिए क्वाड सदस्य प्रतिबद्ध हैं। इसके अलावा वे दक्षिण चीन सागर में पीएलए नौसेना द्वारा पैदा की गई किसी भी चुनौती से निपटने के लिए भी तैयार हैं।

विश्लेषकों ने कहा, भारतीय नौसेना अगले साल तक अपनी दूसरी परमाणु ऊर्जा चालित बैलिस्टिक मिसाइल पनडुब्बी, आईएनएस अरिघाट के साथ स्वदेशी विमानवाहक पोत आईएनएस विक्रांत को कमीशन कर सकती है। इससे भारत मलक्का स्ट्रेट्स से लेकर अदन की खाड़ी तक और उससे भी आगे तक नजर रख सकेगा।

नौसेना प्रमुख एडमिरल करमबीर सिंह के नेतृत्व में बल का ध्यान अंडमान और निकोबार द्वीप समूह में तेजी से विकसित हो रहे सैन्य ढांचे पर रहा है। नौसेना तीसरे विमानवाहक पोत के निर्माण के लिए भी इच्छुक है।

https://www.amarujala.com/india-news/indian-navy-vikramaditya-us-nimitz-with-two-destroyers-of-australia-japan-will-conduct-war-games-in-goa

DC Defence.Capital
BUSINESS AND POLITICS OF ARMING INDIA NOVEMBER 2020

Sat, 07 Nov 2020

Vision 2030: Build India as UAV Factory of the World

By Rhea Dhar

Amidst the recent Sino-Indian military stand-off, there are conflicting reports on India's move to acquire the Medium-Altitude Long-Endurance (MALE) armed Predator-B drone from the United States, a weapons carrying platform that can destroy targets using laser-guided bombs or missiles.

This move comes after China's plan to jointly produce 48 GJ-2 drones (military version of Wing Loong II) for the Pakistani air force. China has the upper hand on Unmanned Aerial Vehicle exports, as unlike the US, it attracts customers with its less rigorous export processes to determine the weapon's use.

The induction of drones into the Indian military was motivated by the intelligence failures which led to the Kargil conflict in 1999 and the 2002 parliament house attack in New Delhi. Over a 100 UAVs were bought into its forces, which were mainly Israel Herons and Searchers. They were used for intelligence, surveillance, and reconnaissance (ISR). After a satisfactory experience with drones, requests for information (RIF) were made by all three wings of the armed forces in the recent years.

Drones or Unmanned Aerial Vehicles (UAVs) are remotely operated aircraft either by pilots, pre-programmed schedules, or automation systems. The absence of any human in the aircraft poses an invaluable advantage regarding the loss and risk to human life in military operations. Additionally, it eliminates the 'G-force' problem faced by piloted aircraft and provides better manoeuvring. They can be used to track communications and enemy movement, detect improvised explosive devices (IEDs), real-time data transmission, and can act as missiles and strike enemy targets.

Over the past five years, India has imported seven per cent of the world's arms. A massive modernisation drive has been planned and phased over the next five years by Government of India. A whopping $250 billion have been attributed to this drive that began in 2015. A major chunk of this is earmarked for developing India's indigenous fleet of unmanned aerial vehicles (UAVs).

It is projected that in the UAV market there will be a 14.1 per cent CAGR growth from 2020 to 2027. It is predicted to reach $21.8 billion by 2027. A 16.2 per cent CAGR increase is predicted from 2020 to 2027, leading to 13.2 million units by 2027. The growth of the UAV market is being driven by three key factors. First, is the rising civil and commercial applications and adoption of UAVs. Second, UAVs are increasingly being used for border patrolling and anti-terrorism activities. Third, globally we are witnessing federal aviation administrations permitting the deployment of UAVs in different industries. However, the growth is anticipated to be obstructed by the many restrictions placed on commercial use by various countries.

Pre-COVID estimates showed that by the end of 2021, the Indian drone market will have a potential of $900 million (some experts argue that it will be much higher), and the global market of $21.47 billion. Although the estimates are impacted by COVID-19, it is believed that due to the adoption of UAVs in combatting and responding to this pandemic, there will be an increase in demand, which will lead to the industry's growth. Not only do drones provide an alternative to traditional mobility and transportation, they also reduce the cost of compliance and provide reliable data. They can and are being used in sectors such as health, city administration and planning, agriculture, emergency rescue and response, village mapping, damage assessment, inventory management, flood monitoring, retail, and delivery of food services and goods. The Government of India recently announced an initiative to use drones to map all villages throughout the country to create a digital repository.

Impact of Covid-19 on the UAV Industry

COVID-19 has brought about a global economic slowdown affecting most markets, including the UAV sector. Due to shutdowns or slowdowns in component suppliers worldwide, the availability of sub-components and as a result finished product was reduced. Disruptions to the supply chain have also slowed down shipments of the UAVs to important markets. With the Jan. 2020 announcement of the COVID-19 virus outbreak, Chinese exports reduced significantly. This severely affected all UAV industries across the world dependent on Chinese imports of cameras, gimbals, and batteries. DJI (largest global UAV manufacturer) also announced shortages due to the virus.

A report by Meticulous Research on the future of the UAV industry analysed the market's post-COVID recovery in three scenarios - fast recovery, slow recovery, and severely impacted.

In the fast recovery scenario, it found that during 2020 and 2021, the market revenues are somewhat affected, however, it will be followed by consolidation of the market revenues in subsequent years. In the slow recovery scenario, there will be a minor dip in market revenues in 2020 and 2021 after which it will recover at a moderate to slow rate 2022 onwards. In the severely impacted scenario, there will be a sharp decline in the market revenues in 2020 and 2021, followed by gradual market growth in the coming years.

Due to a reduced military spending by countries globally, there is a staggered market growth predicted in 2020. Defence contracts that were to be signed in 2020 have now been postponed due to the shift of focus on sectors such as healthcare. However, the pandemic has highlighted the various non-military uses of UAVs, such as conducting necessary surveillance, delivering medicines and food supplies to remote locations. Amidst the pandemic, the civil and commercial demand for UAVs continues to grow to create market revenue prospects.

In India, there are several sectors where drone usage has not been completely explored. Precision agriculture, cinematography, inspection and maintenance, gas and refining, and surveillance and monitoring, are such sectors. Indian barriers on large-scale commercial adoption and production of drones has been a hindering factor of UAV usage exploration. This backdrop along with the foreign nature of this technology, poses a unique challenge for policy makers.

Israel - India collaboration

In Feb. 2020, India's Bharat Electronics Limited and Israel Aerospace Industries signed an MoU to create a centre for maintenance and technical support for Indian air defence systems. Israel Aerospace Industries also signed a strategic collaboration with two Indian firms, Dynamatic Technologies Limited and Hindustan Aeronautics Limited, to work on drones that will be manufactured in India. Trade currently stands at a $5 billion, but experts have indicated that as part of the improvement in bilateral relations it may be increased to $20 billion in the coming decades.

Elbit Systems and Rafael Advanced Defense Systems are two major Israeli firms which have supported the Indian defence forces' needs for many years. India has been dependent on Israeli products for decades, importing up to 49 per cent of their exports from 2013-2017. In 2017, India was their largest purchaser, after which purchases from Israel dropped. Israel is the second largest seller to India's defence forces, Russia being the number one supplier.

Under the spirit of 'Make in India', foreign companies must work with domestic companies to create products locally. In 2018, Adani Defence and Elbit formed a joint venture in Hyderabad for manufacturing Hermes drones. Alpha Design Technologies works with Bharat Electronics to develop and manufacture electronic warfare and electro-optics.

UAV Regulations in India

In 2014, the Directorate General of Civil Aviation (DGCA) issued a public notification, forcing a prohibition on the civil utiliaation of drones, considering a legitimate concern for safety and national security, subject to advance guidelines. Directorate General of Foreign Trade also restricted the import of UAVs.

In Dec. 2018, the DGCA took an increasingly progressive position, and it recognised that UAVs have possible civil uses and forcing a sweeping ban was not warranted. After this, public notification draft guidelines were issued, expressing the future possibilities of drone utilisation and innovation in India. This arrangement of guidelines paid attention to the difficulties of compliance emerging from a licensing regime.

This draft proposes the creation of Digital Sky, which works as a stage for convenient paperwork filing to acquire operators' permits and unique identification numbers. These permits and ID numbers are essential for most remotely piloted aircraft (RPA) activities under the guidelines. The guidelines have classified the UAVs under five classifications - large (greater than 150 kilograms), medium (25 kilograms to 150 kilograms), small (2 kilograms to 25 kilograms), micro (250grams to 2 kilograms), and nano (250 grams or less). Drones more than 2 kilograms in weight must be registered. It was additionally set out that the drones are to be flown inside the visual line of sight (VLOS).

In Jan. 2019, the drone ecosystem policy roadmap was realised by a special task force under the Ministry of Civil Aviation. It focused on attending to challenges such as autonomous operations and Beyond Visual Line of Sight (BVLOS).

In 2019, the Ministry of Civil Aviation additionally revealed the National Counter Rogue Drone guidelines with a plan to address the national security and legal issues, which have revealed themselves in different jurisdictions because of unchecked and unregulated activities of drones.

The MoCA and DGCA also set up a portal, the Government Authorization for Relief Using Drones, also known as GARUD. The portal guarantees a fast track process of giving determined exceptions to government agencies to conduct COVID-related operations to protect the health of frontline workers.

POINTS TO PONDER

Lack of sufficient funds

There is a huge gap between the market potential and the capital being put in to harness that potential. India has increased in terms of market and demand but is lagging the world because a $2 million funding has been provided to tap into a $5 billion market, which is too less.

Need for private players

While it may be expected that government agencies will be one of the biggest end-clients of the business, new ecosystems should be created by means of public-private partnerships. Most PSUs have their own drone programmes. It is recognized that the private sector can benefit the innovation and creation in the UAV industry and hence support must be provided to private entities big or small. As referenced in the draft DGCA Circular on Requirements for Operation of Civil Remotely Piloted Aircraft System (RPAS), arrangements for easy access to testing should be made for private players too (Defence Aviation, 2020). Policy makers should further reserve at least 25 per cent of the drone business for the private industry.

Difficulties faced by entrepreneurs

Entrepreneurs in the UAV industry are faced with various issues. More on field exposure for entrepreneurs is required to increase innovation. On-field exposure is limited due to low Ease of Doing Business. There are still many hurdles one must overcome in the drone business in India. Currently, most of the entrepreneur's energy is being spent on survivability and not innovation, which impacts the R&D capability.

Dependence on China

India is dependent on imports for some critical components, of which most are Chinese imports due to their good quality and price. This dependence must be reduced either by boosting R&D in

this field for large scale manufacturing, or by reverse engineering the imported product and producing it within India.

R&D Concerns

Our R&D, which is insufficient, is dependent on demand and never has futuristic motivations. It is also motivated by the aspiration of being published in an international journal. This poses a challenge because attempting to compete with global trends often side-lines the real needs of India. There needs to be an incentive which mobilises the industry and academia to work together.

Currently, R&D depends on government grants, which do not have strict set goals or milestones. If the industry begins funding, then there will be certain expectations in place for practical results.

R&D is also plagued with extremely high overhead costs. The overhead costs of a beginner R&D firm are as large as those of a large-scale manufacturer. It should ideally only be of the workers and capital goods. It is necessary to provide a way to reduce their overheads.

Pressure on R&D to pay funds and generate revenue should also be reduced, as R&D requires patience.

Shortages of orders

Within the defence budget, due to non-availability of funds for capital expenditure, orders are done only at 50 per cent of the required numbers. This restricts the Indian players from taking part in the defence procurement for military drones, as the numbers are inadequate to sustain the business.

Lack of awareness

Users and manufacturers alike may lack the knowledge of Digital Sky as well as NPNT. Furthermore, in India where drones are imported, these regulations may cause a roadblock, as the drones will need to be modified, in accordance with Indian regulations.

Reforming the role of the government

The market should be allowed to decide which firm is better at producing drones in the micro, mini, or large category. The government should not decide this.

Currently, government officials face no penalty if they re-tender, delay a tender, or do not sign a tender. The official, in this case, is only concerned about the questions, which will be asked if they sign a tender which demotivates them to sign a tender. This needs to be changed.

Roles of State governments

State governments ought to have drone exploratory activities to investigate drone applications in the state. For instance, each district collector can be provided with drones to be used for different applications. Furthermore, centralising this effort will help explore and study the various applications in detail.

Training and skilling

Focussing on training and skilling will ensure a safe and smooth transition as India's drone usage is expanded, particularly in the private sector. In tandem with this, the Indian Institute of Drones (IID) with the GOI can assume an essential role in training the youth in drone innovation, UAV piloting and other activities while focusing on security and safety.

Drawbacks/Challenges faced due to UAV usage

Although reducing restrictions in the civil use of drones is argued for, the absence of such, leads to various concerns, of which some are mentioned below.

Unauthorized Surveillance

Using the cause of national security, the system of drones with impeccable high-resolution cameras can be utilised to track profiles and personal data of individuals, by both the state and private agencies. Drones working with fake towers can crack wi-fi codes and intercept messages and mobile phones without the consent and knowledge of the owners of such devices. Advanced drones can infiltrate test networks and gather unencrypted data and even set up counterfeit access points. This unwarranted surveillance has a chilling impact on the people's right to dissent, citizen's civil liberties, and their intellectual privacy. In addition, data gathered secretly can be

utilised to extort or ruin opponents. This collected data can also be used to draw inferences of other data which raises issues of consumer power and autonomy, and privacy rights.

Security Hazards

Drones utilized by the state for the reasons law enforcement, and for infiltration prevention at the border contain sensitive information. Computers can be compromised. Meanwhile, drones can be hacked, spoofed, or jammed and its information can be exposed to abuse.

Apart from this, drones can be used to hack different devices. Scientists at Singapore University of Technology with the assistance of drones hacked printers from outside the building and gathered the material data.

Risk of Accidents

We cannot deny the risk of accidents a considerably heavy drone flying at a certain height pose. Accidents can occur due to collisions, loss of navigational control, battery failures, or failure of equipment. Drones are not equipped with the advanced technology required to handle such collisions. Furthermore, the user may not be trained enough to handle such accidents. Within six months over 600 cases of drones flying too close to airplanes were reported in the US.

Way forward

The focus has been on improving ground systems, post which, it will move to underwater equipment. A completely unmanned physical warship is something yet to be developed. Efforts are needed to increase the radius of command by using satellites as right now we can operate only up to a certain distance before the earth's curvature prevents the signal from reaching the drone.

Additionally, focus must be placed on creating an ecosystem of profound R&D and testing in India. Work must be carried out to determine how India can be made the testing centre of the world. Importance must be given to generating Indian IP. Policy changes must be made to motivate individuals to innovate within India and choose India for their testing and R&D. Testing could take place in the two Defence Corridors. Red tape and industrial hurdles must be removed. Industry-academic partnerships must be improved, in a way that the industry gets the revenue and academia gets the royalties.

Regulations in the industry must be carefully eased. Furthermore, there is no need to produce everything from scratch domestically. Some parts can be imported, and some can be reverse engineered and then produced in India. The focus should be on increasing and determining applications and use cases.

To meet domestic demand and cater to global demand, manufacturing clusters can be identified under the self-reliance theme and 'Make in India'. Joint ventures with other countries for production can be adopted as well.

An exclusive organisation, independent of the DRDO, must be created only to look at the UAV industry. It must be given at least Rs 5,000 crore and must work to create a roadmap for the next 15 years.

There has been a huge increase in demand for UAVs but this demand needs to be aggregated carefully to open up an economically viable path for those who want to build this technology or the components of drones in India. The government can realign the guidelines and regulations of the drone industry with the focal approaches of 'Atmanirbhar Bharat' and ease of doing business to improve the domestic development of this industry. As the industry, currently driven by the applications around COVID-19, continues to evolve and improve, concerns around privacy and data protections will have to be addressed.

The EurAsian Times

Sat, 07 Nov 2020

India vs Iran: As India still relies on Israel, how did Iran emerge as a drone super power despite crippling US sanctions?

Iran President Hassan Rouhani, much like the leaders of other countries has his eyes hooked to the television screens to learn the outcome of the US Presidential Elections 2020, probably praying that President Donald Trump loses out to Joe Biden in order to "make Iran great again".

President Trump has for long remained a thorn in Tehran's path to development ever since his decision to unilaterally withdraw from the Iran nuclear deal in 2018, following which Tehran has been repeatedly battered by a series of sanctions imposed by Washington which have led to its stunted growth.

However, much like adversity creating opportunity, while Iran has seen restrictions on the import and export of defense equipment, it has found the power within itself to enhance its defensive capabilities especially in the field of drone technology.

Iran has started mass production of Mohajer-6 armed drone UAV

Recently, Iran has unveiled its newest attack Mohajer-6 Drone, which is a 10-feet-long jet-powered unmanned aerial vehicle (UAV) called the Kian, which according to the state media has the capacity to carry 6 guided munitions.

According to Defense writer David Axe, the drone should not be judged on its simple appearance.

"With its simple shape and apparent fiberglass fuselage, the new UAV probably is unsophisticated. But even an unsophisticated drone can pose a danger to enemy forces if its user employs it the right way and in sufficient numbers," said Axe.

The Kian was revealed at a ceremony in Tehran last year by the head of Iran's air-defense force, Brigadier General Alireza Sabahifard.

"The Kian can fly more than 600 miles and climb to an altitude of 15,000 feet. It can carry out precision strikes against distant targets … far from Iran's borders." Said Sabahifard

Iran had earlier showed off a series of drones which included a UAV called Mobin, which can supposedly fly up to 45,000 feet high for 45 minutes, and has a warhead of 120 kilograms.

Another set of drones that were showcased by Iran were the "smart bombs" dubbed by the name of Yasin and Balaban, along with a news series of Qaem "optic bombs".

According to Commander of Iranian army drones Brigadier General Hasannejad, the UAVs will be instrumental in safeguarding the countries boundaries from threats.

"With the deployment of these unmanned aerial vehicles, any threat to the Iranian borders and even beyond the borders, will be identified, tracked down and removed before it could even take form," said Hasannejad.

According to Seth J. Frantzman, Executive Director of the Middle East Center for Reporting and Analysis, Iran has now become a superpower in drone making.

"I've argued Iran is a 'drone superpower' considering the expansion of its UAV arm in recent years,"

Iran began its drone program during the Iran-Iraq war with UAVs [Unmanned Aerial Vehicles] such as the Mohajer and Ababil series,"

Iran is very proud of its success in creating an indigenous drone industry and pioneering its own UAVs."

Thomas Harding, a London-based journalist, while writing an editorial for the National News, explores how the country's clampdown at the hands of the United States gave them the power to develop the technology of drones.

"Ironically, it is sanctions that forced Iran to develop its own successful drone industry mostly by reverse engineering equipment that it could buy on the open market or by other means. It has quickly found that drones are smart, relatively inexpensive and can carry out the work of hundreds of soldiers,"

Furthermore, it is a technology easily exported to its proxies allowing them to carry on Iran's strategic aims with a degree of 'plausible deniability'. Without a doubt, Iran has come a long way in producing drones that, while not the equal to US and Israeli counterparts, at least make it a serious and recognized player in unmanned warfare." said Harding.

However, on one hand, Iran has been able to follow the likes of Turkey which is considered to be a drone superpower along with the likes of Israel, the US, and the UK, on the other hand, India has found itself lagging behind in the race for drone superpower status.

Having found itself in a region sandwiched between "Iron Brothers" China and Pakistan, New Delhi has seriously considered the idea of exploring the vast potential in the drone technology market.

However, while each of India's armed forces services has its own UAV arms operational for the last two decades which has been supplemented by the indigenization of the sector by India's DRDO, the technology has faced barriers due to drone regulations within the country.

"While the Defence Research and Development Organisation (DRDO) has been trying to indigenize these, the private sector UAV industry has been growing. Unfortunately, the evolution of technology has been restricted due to ambiguity in implementation of Drone Regulations promulgated by Airport Authority of India (AAI)." said Huma Siddiqui, while writing an editorial for the Financial Express.

The country which has lost so many Indian security personnel in the Jammu and Kashmir border cross-firing, have felt the need for higher automation in activities like the UAVs.

https://eurasiantimes.com/as-india-still-relies-on-israel-how-did-iran-emerge-as-a-drone-super-power-despite-crippling-us-sanctions/

THE TIMES OF INDIA

Sun, 08 Nov 2020

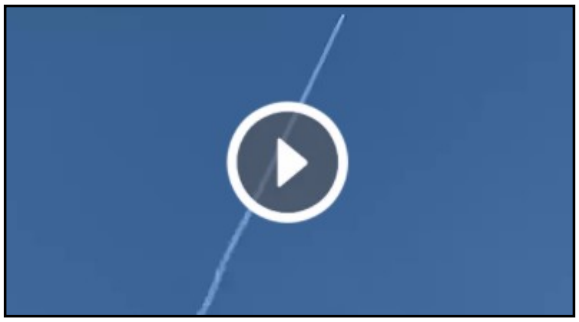
ISRO'S PSLV-C49/EOS-01 mission successful; 10 satellites placed in orbit

By U Tejonmayam

Chennai: After nearly a year of silence, Sriharikota is back in action with Indian Space Research Organisation's PSLV-C49 successfully lifting off from the first launch pad at Satish Dhawan Space Centre on Saturday afternoon.

The rocket, in its 51th flight, carried an all-weather earth imaging satellite EOS-01, previously called RISAT-2BR2, and nine foreign satellites.

The rocket lifted off at 3.12pm, instead of at the scheduled time of 3.02pm. The launch was postponed by 10 minutes due to inclement weather conditions observed during countdown.



ISRO'S PSLV-C49/EOS-01 mission successful; 10 satellites placed in

More than 15 minutes after liftoff, the launch vehicle successfully injected its primary payload, EOS-01, into a low earth orbit. It was followed by nine customer satellites.

EOS-01 carried an X-band synthetic-aperture radar. The space agency said EOS-01 is an earth observation satellite intended for applications in agriculture, forestry and disaster management support.

After the success of the mission, ISRO chairman K Sivan said this was a very "special and unusual mission" for the space agency. "Space activity cannot be done from home. Especially during a launch, every engineer, technician and all other employees must travel from different centres and work together here at SHAR. Also, various hardware had to be carefully transported from various centres."

"Our Isro team rose to the occasion and worked with limited staff, followed all government protocols with no compromise on quality," he said.

Sivan said three more launches are lined up including PSLV-C50 carrying CMS01, launch of new vehicle SSLV carrying EOS-02 and GSLV F-10 carrying EOS-03.

9 other satellites placed in orbit

The foreign satellites include an R2 satellite from Lithuania, which was a technology demonstration, four Kleos (KSM1A/1B/1C/1D) satellites from Luxembourg for maritime applications and four Lemur (Lemur-1/2/3/4) satellites from the US meant for multi-mission remote sensing application.

Saturday's launch was the first launch for Isro after the Covid-19 pandemic delayed its schedules. It was 76th launch vehicle mission from the Sriharikota spaceport, 38th launch from the first launch pad and second flight of PSLV with 'DL' variant carrying two strap-on boosters.

https://timesofindia.indiatimes.com/india/isros-pslv-c49/eos-01-mission-successful-10-satellites-placed-in-orbit/articleshow/79098000.cms

The Indian EXPRESS

Sun, 08 Nov 2020

Explained: EOS-01, India's latest earth observation satellite that was launched today

EOS-01 is nothing but another Radar Imaging Satellite (RISAT) that will work together with RISAT-2B and RISAT-2BR1 launched last year

By Amitabh Sinha

India sent its first space mission in almost a year with a launch of EOS-01, an earth observation satellite, this afternoon. EOS-01, along with nine satellites from foreign countries, was launched by a PSLV rocket twelve minutes past three.

This is ISRO's first mission since the launch of RISAT-2BR1, another earth observation satellite similar to EOS-01, on December 11 last year. After that, ISRO had also sent communication satellite GSAT-30 in space in January this year, but that was done using an Ariane rocket launched from French Guiana.

Thereafter, ISRO's launch schedule was entirely derailed by the coronavirus epidemic. ISRO had planned more than 20 satellite launches in the fiscal year 2020-21, including high profile missions like Aditya L1, the first exploratory mission to Sun, and unmanned Gaganyaan, the precursor to India's first manned space flight. Half of the planned launches were those of earth observation satellites like the one which were sent today.

New nomenclature

EOS-01 is nothing but another Radar Imaging Satellite (RISAT) that will work together with RISAT-2B and RISAT-2BR1 launched last year. EOS-01 was initially named RISAT-2BR2, and was supposed to be the third of the three-spacecraft constellation aimed at providing all-weather round-the-clock service for high-resolution images.

With EOS-01, ISRO is moving to a new naming system for its earth observation satellites which till now have been named thematically, according to the purpose they are meant for. For example, the Cartosat series of satellites were meant to provide data for land topography and mapping, while the Oceansat satellites were meant for observations over sea. Some INSAT-series, Resourcesat series, GISAT, Scatsat, and some more are all earth observation satellites, named differently for the specific jobs they are assigned to do, or the different instruments that they use to do their jobs.

Land and forest mapping and monitoring, mapping of resources like water or minerals or fishes, weather and climate observations, soil assessment, geospatial contour mapping are all done through earth-observation satellites.

Henceforth, it seems, all the earth observation satellites would be called EOS-series.

Radar imaging

EOS-01, like its cousins RISAT-2B and RISAT-2BR1, uses synthetic aperture radars to produce high-resolution images of the land. One big advantage that radar imaging has over optical instruments is that it is unaffected by weather, cloud or fog, or the lack of sunlight. It can produce high-quality images in all conditions and at all times.

Depending on the wavelength of the electromagnetic radiation used by the radar, different properties on land can be captured in the image. For example, a low wavelength signal can capture tree cover or vegetation, while a higher wavelength signal can penetrate even dense tree cover to look at the contours of land beneath.

EOS-01, and its sister RISATs, use X-band radars that operate at low wavelengths and are considered best for monitoring of urban landscape, and imaging of agricultural or forest land. According to ISRO, EOS-01 is intended for applications in agriculture, forestry and disaster management support. The radar images are also considered to be immensely useful for military requirements.

New Rocket

For the launch of EOS-01, ISRO used a new variant of its PSLV rocket that has been flown only once before, in January last year, when it had placed the Microsat-R satellite in orbit. This Microsat-R was the one that was brought down in March last year in India's first anti-satellite test, a demonstration of its capability to hit an in-orbit enemy satellite in space.

This variant of PSLV does not become waste after depositing its satellite in the orbit. Instead, the last stage of the rocket, the one that remains after the satellite is separated, can acquire its own orbit and be used as an orbital platform for other onboard instruments to perform experiments in space. In effect, the fourth stage acts like another satellite, with a life span of about six months.

For the PSLV, this was the 51st flight. Only two of its launches have not been successful.

Of the nine foreign satellites being carried in the mission, four each are from the United States and Luxembourg, while another is a technology demonstrator from Lithuania.

https://indianexpress.com/article/explained/what-is-eos-01-india-earth-observation-satellite-6988784/

PHYS.ORG

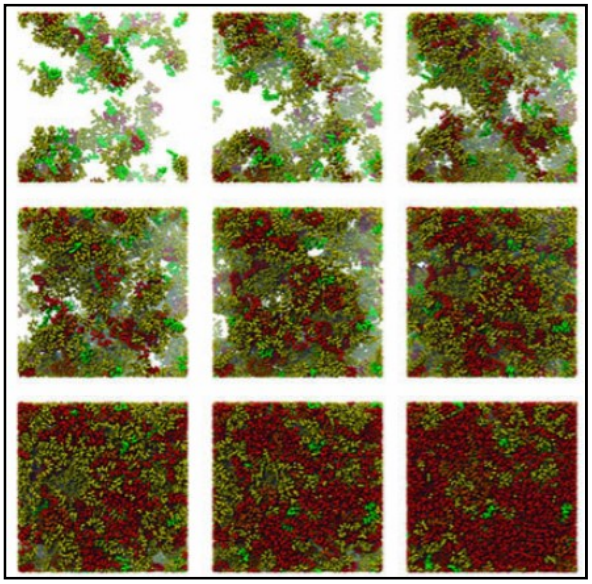
Sat, 07 Nov 2020

Lab explores new resins for light-based 3-D printing

By Jeremy Thomas

A Lawrence Livermore National Laboratory (LLNL) team has simulated the cross-linking of 3-D-printed polymer networks, a key step toward developing new functional resins for light-based 3-D-printing techniques including two-photon lithography (TPL) and volumetric additive manufacturing (VAM).

The team used molecular dynamics simulations to study, at a microscopic level, the kinetics and topology of three different molecules from the same reactive group (acrylate) but containing different nonreactive components. The researchers found that differences in the dynamics and structure of the resulting cross-linked polymers, built using the TPL and VAM processes, were a result of differences in the nonreactive parts of the molecules. The research appears in the Oct. 15 issue of the *Journal of Physical Chemistry B* and is featured online as a supplementary cover.



LLNL researchers used molecular dynamics (MD) simulations to study the polymerization of three different molecules from the same reactive group (acrylate) but containing different nonreactive components. Shown are "snapshots" from an MD simulation of a liquid monomer as it polymerizes and gradually becomes a solid, revealing the emergence of a highly cross-linked network from monomers with two acrylate functional groups. Credit: John Karne

Researchers said the insights gained from the study open the door to rationally designed photoresists and will aid them in their quest to design new custom photosensitive resins capable of pushing the boundaries of TPL and LLNL-developed VAM. These techniques generate 3-D objects by projecting patterned light into liquid resins, causing them to harden at desired points within seconds. The resins used in these processes often contain different molecules with the same reactive functional groups, and their formulation relies on trial and error methods, with the results treated as trade secrets.

"Our combination of molecular dynamics simulations and mathematical graph theory allows us to modify or perturb the chemistry and physics of molecules that serve as the building blocks in AM techniques like TPL and VAM and see the impact on the resulting polymer," explained John Karnes, the paper's lead author. "Since we can see every atom in these simulations, we're starting to develop intuition that bridges the gap between microscopic network topology and macroscopic behavior, like understanding the relationship between intramolecular loops or cycles, and the point at which the liquid resin gels to form the solid printed part."

LLNL material scientist Juergen Biener said the team is continuing the work by exploring longer length and time scales, simulating mechanical testing of printed parts and modeling other types of polymerization of interest to LLNL.

More information: John J. Karnes et al. On the Network Topology of Cross-Linked Acrylate Photopolymers: A Molecular Dynamics Case Study, *The Journal of Physical Chemistry B* (2020). DOI: 10.1021/acs.jpcb.0c05319

Journal information: Journal of Physical Chemistry B

https://phys.org/news/2020-11-lab-explores-resins-light-based-d.html

Sat, 07 Nov 2020

Explaining gravity without string theory

For decades, most physicists have agreed that string theory is the missing link between Einstein's theory of general relativity, describing the laws of nature at the largest scale, and quantum mechanics, describing them at the smallest scale. However, an international collaboration headed by Radboud physicists has now provided compelling evidence that string theory is not the only theory that could form the link. They demonstrated that it is possible to construct a theory of quantum gravity that obeys all fundamental laws of physics, without strings. They described their findings in *Physical Review Letters* last week.

When we observe gravity at work in our universe, such as the motion of planets or light passing close to a black hole, everything seems to follow the laws written down by Einstein in his theory of general relativity. On the other hand, quantum mechanics is a theory that describes the physical properties of nature at the smallest scale of atoms and subatomic particles. Though these two theories have allowed us to explain every fundamental physical phenomenon observed, they also contradict each other. As of today, physicists have severe difficulties to reconcile the two theories to explain gravity on both the largest and smallest scale.

No strings attached

In the 1970s, physicists proposed a new set of physics principles to address this problem, extending the laws proposed by the general theory of relativity. According to this so-called "string theory," everything around us is formed not by point particles, but by strings: one dimensional objects that vibrate. Since its introduction, string theory has been the most widespread theoretical framework that is thought to complete Einstein's general theory of relativity to a theory of quantum gravity.

However, a new demonstration by theoretical physicists at Radboud University now shows that string theory is not the only way to do this. "We show that it is still possible to explain gravity using quantum mechanics without using the laws of string theory at all," says theoretical physicist Frank Saueressig. "We demonstrate that the idea that everything consists of point particles could still fit with quantum gravity, without including strings. This particle physics framework is also verified experimentally, for example, at the Large Hadron Collider (LHC) at CERN."

Seen in experiments

"For scientists, this alternate theory is attractive to use because it has been extremely difficult to connect string theory to experiments. Our idea uses the physical principles that are already tested

experimentally. In other words: nobody ever observed strings in experiments, but particles are things that people definitely see at LHC experiments. This lets us bridge the gap between theoretical predictions and experiments more easily."

Only one set of laws

After having demonstrated that their ideas are capable of resolving long-standing problems in particle physics, the consortium is currently exploring the resulting implications of their new laws at the level of black holes. "After all, there is only one set of laws of nature and this set should be able to apply to all kinds of questions including what happens when we collide particles at fantastically high energies or what happens when particles fall into a black hole. It would be fantastic to demonstrate that there is actually a link between these seemingly disconnected questions which allows to resolve the puzzles appearing at both sides."

More information: Tom Draper et al. Finite Quantum Gravity Amplitudes: No Strings Attached, Physical Review Letters (2020). DOI: 10.1103/PhysRevLett.125.181301

Journal information: Physical Review Letters

https://phys.org/news/2020-11-gravity-theory.html

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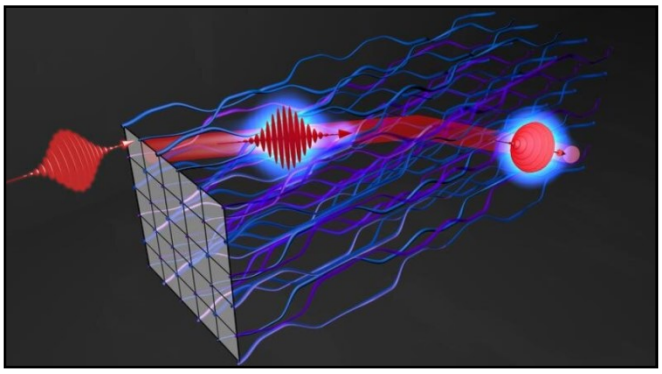
Sat, 07 Nov 2020

Researchers develop nonlinearity-induced topological insulator

Researchers from the University of Rostock have developed a novel type of nonlinear photonic circuitry in which intense light beams can define their own path and, in doing so, render themselves impervious to external perturbations. This discovery was recently published in the renowned journal *Science*.



Nonlinearity-Induced topological insulator: The synthetic photonic material composed of complex interwoven waveguides allows light to protect itself from external perturbations. Credit: Lukas Maczewsky, University of Rostock

"Photons are an unruly bunch," explains Professor Alexander Szameit, whose group carried out the groundbreaking experiments. "As soon as one manages to herd them towards one specific point in space and time, they immediately disperse once again in all directions." Indeed, centuries of research have been devoted to shaping the flow of light by a number of means: Lenses and curved mirrors can tightly focus rays from the sun. Powerful lasers generate coherent beams and short pulses of intense light. And fiber-optic cables deliver staggering amounts of optically encoded data across the world wide web. Yet, light waves are surprisingly delicate entities: A small crack in a lens, a mote of dust drifting through a laser beam, or a kink in the fiber can upset the intricate mechanisms that transform light into perhaps the most versatile tool ever harnessed by humanity.

Electronic topological insulators—solids that do not conduct electricity inside their bulk, yet at the same time are perfectly conductive along their surface—were experimentally realized for the first time in 2007 by Laurens Molenkamp and his team at the University of Würzburg. Their photonic counterparts have fascinated Prof. Szameit for a long time. "Ever since our first implementation of a topological insulator for light, we have strived to discover how these peculiar systems can be utilized," the physicist remembers.

While photonic topological insulators can guide light along precisely defined paths, and the mathematical framework underpinning their design endows them with an unprecedented degree of robustness towards imperfections or external perturbations, these sought-after properties also present a formidable obstacle. "Once injected into a topological channel, light pulses do not suffer from scattering losses, but this insulation also makes them virtually impossible to control without breaking them out of their protective environment," coauthor Dr. Matthias Heinrich summarizes the challenge currently faced by the scientific community.

Of course, on paper, the solution may seem obvious. "In principle, it's easy. All you need is a switch that you can flip at will to instantly change the topological properties of the system between two light pulses," quips Szameit. However, topology is inextricably linked to the physical arrangement of the waveguide circuit, while ultrashort laser pulses are measured in femtoseconds (a millionth of a billionth of a second) – many orders of magnitude beyond the reach of even the fastest electronic modulators.

In close collaboration with theorists from the University of Rostock, the ICFO in Barcelona, the University of Lisbon and the Moscow Institute for Science and Technology, the team of young researchers found a way to instead let the light itself decide whether to engage topological protection or to behave as if in a conventional medium. "Depending on their peak intensity, optical pulses can behave in fundamentally different ways," elaborates Lukas Maczewsky, Ph.D. student and leading author of the work. "Nonlinearity is the magic word: In photonics, sometimes two plus two really is more than just four." After two years of intense research and countless hours in the labs of the Institute of Physics at the University Rostock, these efforts came to fruition.

The nonlinearity-induced topological insulator—a novel synthetic material—allows light pulses above a certain threshold intensity to establish a transient topological domain in their immediate vicinity. The self-avowed "Star Trek" fan Szameit paints a vivid picture of the complex physics at play: "Just like the U.S.S. Enterprise raises its shields, the self-generated protective cocoon follows the light pulses and preserves them along their chosen path."

The successful international collaboration has substantially advanced fundamental science in the field of quantum optics and in particular the research into photonic topological insulators. Until these pieces can be assembled into a workable optical quantum computer—the holy grail pursued by groups all around the world—several challenges remain to be resolved. Nevertheless, the physicists' newest discovery holds great promise for numerous innovative applications such as topologically protected all-optical signal processing and self-improving photonic neuronal nets. Given the rapid pace of progress, these ideas that today may seem like science fiction, could soon become reality.

More information: "Nonlinearity-induced photonic topological insulator"
Science (2020). science.sciencemag.org/cgi/doi … 1126/science.abd2033
Journal information: Science

https://phys.org/news/2020-11-nonlinearity-induced-topological-insulator.html

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Sat, 07 Nov 2020

Researchers find material ultra-sensitive to light for use in optical computers

Each year, there is a growing demand for more powerful and advanced computers. The problem with conventional ones, though, lies in the electrons that play a major role in them. In any structure with an electric current running through it, there is a risk of overheating, which creates fundamental limitations on the minimum size of computational elements. A solution to this problem lies in optical computers that will process information transmitted by the movement of photons that don't heat up, as opposed to electrons.

"We will soon reach the limit when any further modernization of electron-based machines will not allow for the necessary increase in efficiency. To start using optical computers, we have to create chips and lasers of comparable size. We need materials with high refractive coefficients to develop optical elements at a nanoscale. The refractive coefficient tells us how well a structure reacts to light. If its interaction with light is poor, then the device will work accordingly," expounds Anton Shubnic, a student at ITMO's Faculty of Physics and Engineering.

There are not many materials highly sensitive to light. One of them is silicon (Si), with a refractive coefficient of 4. There are no known materials with a higher refractive coefficient in the visible range. Moreover, the researchers admit, it is not completely clear, where one could look for them. After extensive mathematical calculations, ITMO University physicists were able to identify a parameter that could point at how quickly the light would pass through a semiconductor before physical experiments or complex calculational modeling. This parameter depends on the electronic properties of a material: its band gap and the effective mass of an electron.

"We focused our attention on semiconductors. These materials have band gaps, known for most of them and frequently used. In optics, the band gap determines the maximum wavelength at which a material stays transparent. The second parameter is the electron's effective mass. When interacting with other particles in a material, electrons would act as particles with a different mass to the one they originally have," explains Ivan Iorsh, head of ITMO University's International Laboratory of Photoprocesses in Mesoscopic Systems.

Credit: Pixabay/CC0 Public Domain

The band gap is an energy range which electrons can't have in a certain material. If a photon's energy is less than the band gap, then the light can spread in the material, and if the energy is more—then the light will be absorbed. In optics, the band gap determines the maximum wavelength at which a material stays transparent. This parameter is known for many materials and is actively used. The second parameter is the electron's effective mass. When interacting with other particles in a material, electrons would act as though they have a different mass to the one they originally have. And this new mass is known as effective mass.

The theoretical model demonstrated that the higher the ratio is between these two parameters, the higher the refractive coefficient should be. First, the researchers tested their hypothesis on known materials such as silicon and then turned to the ones less studied. As a result, they discovered rhenium diselenide ($ReSe_2$), a highly promising material for optic elements. It turned out that $ReSe_2$ has a refractive coefficient of 6.5 to 7 in the visible range, which is significantly higher than that of silicon.

Now, the researchers are planning to launch a global search through open databases of materials' electronic properties to find other high-refractive-coefficient substances, previously disregarded by optics specialists.

More information: Anton A. Shubnic et al. High refractive index and extreme biaxial optical anisotropy of rhenium diselenide for applications in all-dielectric nanophotonics, *Nanophotonics* (2020). DOI: 10.1515/nanoph-2020-0416

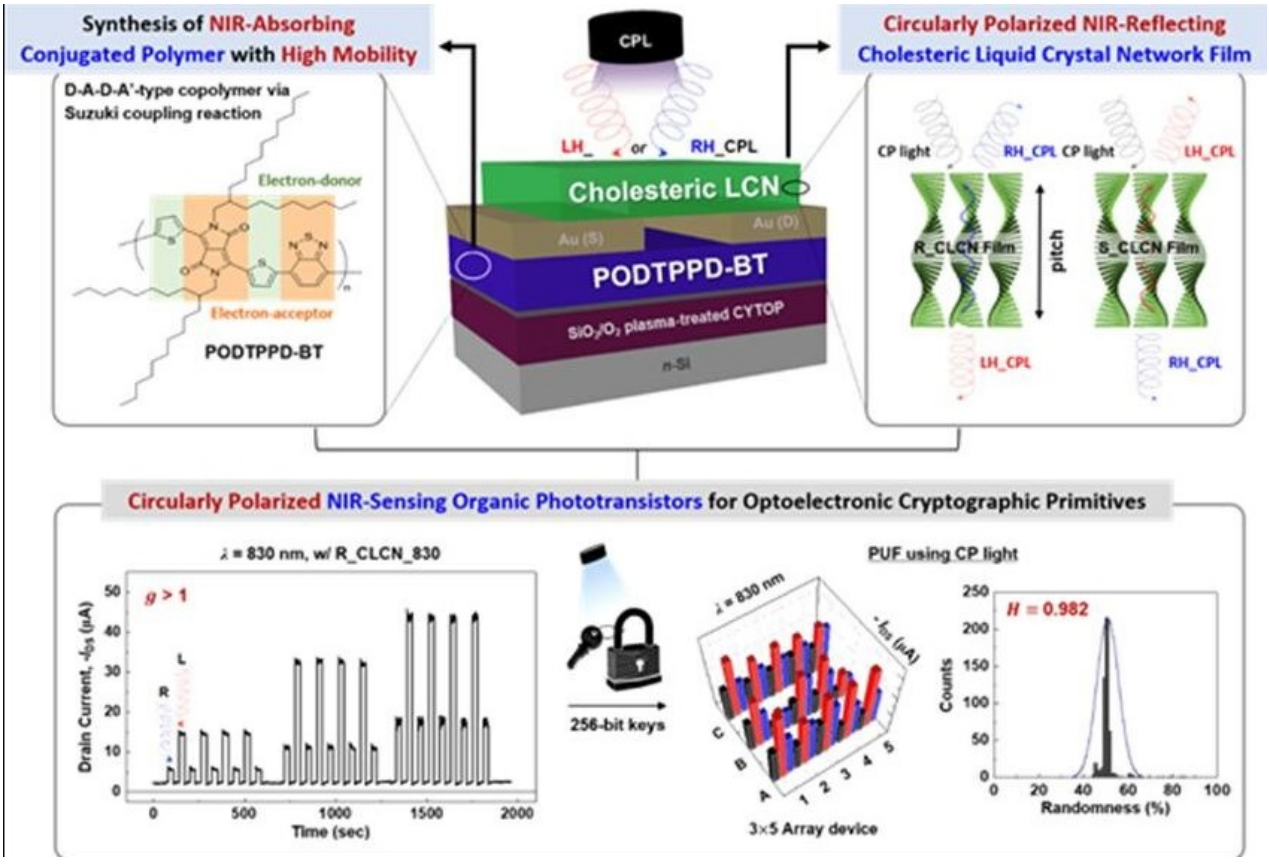
https://phys.org/news/2020-11-material-ultra-sensitive-optical.html

PHYS.ORG

Sat, 07 Nov 2020

Anti-hacking based on the circular polarization direction of light

The Internet of Things (IoT) allowing smart phones, home appliances, drones and self-driving vehicles to exchange digital information in real time requires a powerful security solution, as it can have a direct impact on user safety and assets. A solution for IoT security that has been is a physical unclonable function (PUF) that can supplement software-based key security vulnerable to various attack or physical attack.



A Schematic Diagram of the Major Strategies for the Development of Near-infrared Radiometric Sensitivity Photovoltaic Transistor. Credit: Korea Institue of Science and Technology (KIST)

Hardware-based PUF semiconductor chips, for example, each have a unique physical code, similar to the human iris and fingerprints. Because the variations in the microstructure derived from manufacturing process act as a key value, the security keys generated via PUFs are random and unique, making it impossible to duplicate. However, there were limitations in that the hardware

structure had to be changed in order to increase the number of combinations of keys to enhance cryptographic characteristics.

Under these circumstances, a team led by Jung-Ah Lim and Hyunsu Ju from the Korea Institute of Science and Technology (KIST) Center for Opto-Electronic Materials and Devices announced that they have successfully developed an encryption device that can greatly strengthen the cryptographic characteristics of PUFs selectively detecting circular polarization, without modify the hardware structure, through collaboration with a team headed by Suk-Kyun Ahn, Professor of Polymer Science and Engineering at Pusan National University.

Light, which behaves as both a particle and a wave, can travel in a straight line, while rotating in the form of a spiral, as circularly polarized light.

The core technology applied to the encryption device developed by the KIST and PNU research team is a phototransistor that can detect the circular polarization of light rotating in a clockwise or counterclockwise direction.

The main strategy used in the newly developed photoresistor is a combination of cholesteric liquid crystal and low bandgap π-conjugated polymer with excellent near-infrared light absorption and charge transport properties. The cholesteric liquid crystal film has a strong tendency to selectively reflect near-infrared circularly polarized light, as the amount of light reaching the device is controlled according to the rotational direction of the light. In the study, the device exhibited excellent dissymmetry factor for photocurrent with high sensitivity in detecting circularly polarized light.

The research team succeeded in fabricating a PUF device that could serve as a fundamental solution against hacking, wiretapping, etc. by increasing the number of combinations in generating encryption keys using a simple solution process, without changing the physical size of the array.

Dr. Jung-Ah Lim from KIST said, "This study presents measures to implement a new encryption device amidst the need to develop a highly secure cryptographic technology with the advent of the era of IoT."

Dr. Suk-Kyun Ahn from PNU said, "The technology to discriminate the rotational direction of circularly polaized light based on a simple fabrication process is expected to have a strong potential in not only next-generation encryption devices but also dvarious chiroptical optoelectronic applications."

More information: Hyemi Han et al, High-Performance Circularly Polarized Light-Sensing Near-Infrared Organic Phototransistors for Optoelectronic Cryptographic Primitives, *Advanced Functional Materials* (2020). DOI: 10.1002/adfm.202006236

Journal information: Advanced Functional Materials

https://phys.org/news/2020-11-anti-hacking-based-circular-polarization.html

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Sat, 07 Nov 2020

Scientists work to shed light on standard model of particle physics

By Savannah Mitchem

As scientists await the highly anticipated initial results of the Muon g-2 experiment at the U.S. Department of Energy's (DOE) Fermi National Accelerator Laboratory, collaborating scientists from DOE's Argonne National Laboratory continue to employ and maintain the unique system that maps the magnetic field in the experiment with unprecedented precision.

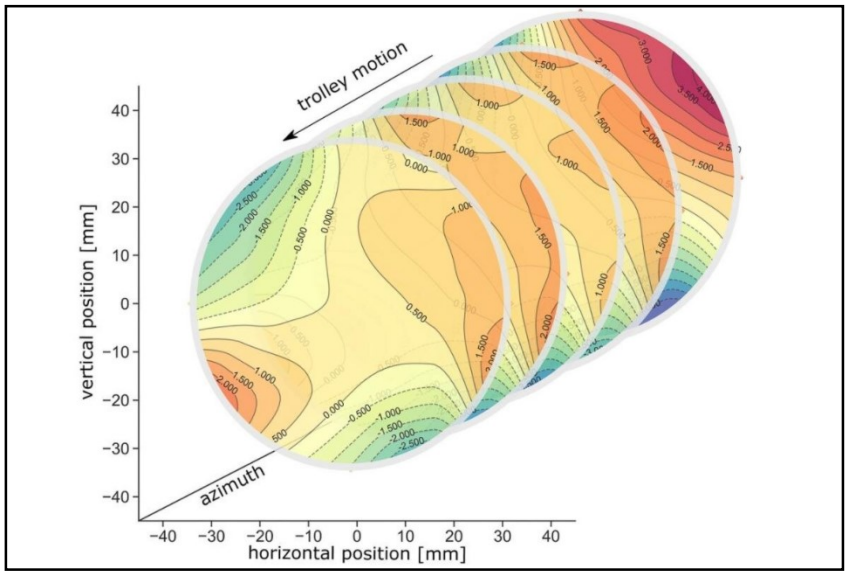
Argonne scientists upgraded the measurement system, which uses an advanced communication scheme and new magnetic field probes and electronics to map the field throughout the 45-meter circumference ring in which the experiment takes place.

The experiment, which began in 2017 and continues today, could be of great consequence to the field of particle physics. As a follow-up to a past experiment at DOE's Brookhaven National Laboratory, it has the power to affirm or discount the previous results, which could shed light on the validity of parts of the reigning Standard Model of particle physics.

High-precision measurements of important quantities in the experiment are crucial for producing meaningful results. The primary quantity of interest is the muon's g-factor, a property that characterizes magnetic and quantum mechanical attributes of the particle.

The Standard Model predicts the value of the muon's g-factor very precisely. "Because the theory so clearly predicts this number, testing the g-factor through experiment is an effective way to test the theory," said Simon Corrodi, a postdoctoral appointee in Argonne's High Energy Physics (HEP) division. "There was a large deviation between Brookhaven's measurement and the theoretical prediction, and if we confirm this discrepancy, it will signal the existence of undiscovered particles."

Just as the Earth's rotational axis precesses—meaning the poles gradually travel in circles—the muon's spin, a quantum version of angular momentum, precesses in the presence of a magnetic field. The strength of the magnetic field surrounding a muon influences the rate at which its spin precesses. Scientists can determine the muon's g-factor using measurements of the spin precession rate and the magnetic field strength.



Typical magnetic field variations as mapped by the trolley at different positions in the Muon g-2 experiment's storage ring, shown at the parts-per-million level. Credit: Argonne National Laboratory.

The more precise these initial measurements are, the more convincing the final result will be. The scientists are on their way to achieve field measurements accurate to 70 parts per billion. This level of precision enables the final calculation of the g-factor to be accurate to four times the precision of the results of the Brookhaven experiment. If the experimentally measured value differs significantly from the expected Standard Model value, it may indicate the existence of unknown particles whose presence disturbs the local magnetic field around the muon.

Trolley ride

During data collection, a magnetic field causes a beam of muons to travel around a large, hollow ring. To map the magnetic field strength throughout the ring with high resolution and precision, the scientists designed a trolley system to drive measurement probes around the ring and collect data.

The University of Heidelberg developed the trolley system for the Brookhaven experiment, and Argonne scientists refurbished the equipment and replaced the electronics. In addition to 378 probes that are mounted within the ring to constantly monitor field drifts, the trolley holds 17 probes that periodically measure the field with higher resolution.

"Every three days, the trolley goes around the ring in both directions, taking around 9,000 measurements per probe and direction," said Corrodi. "Then we take the measurements to construct slices of the magnetic field and then a full, 3-D map of the ring."

The scientists know the exact location of the trolley in the ring from a new barcode reader that records marks on the bottom of the ring as it moves around.

The ring is filled with a vacuum to facilitate controlled decay of the muons. To preserve the vacuum within the ring, a garage connected to the ring and vacuum stores the trolley between measurements. Automating the process of loading and unloading the trolley into the ring reduces the risk of the scientists compromising the vacuum and the magnetic field by interacting with the system. They also minimized the power consumption of the trolley's electronics in order to limit the heat introduced to the system, which would otherwise disrupt the precision of the field measurement.

The scientists designed the trolley and garage to operate in the ring's strong magnetic field without influencing it. "We used a motor that works in the strong magnetic field and with minimal magnetic signature, and the motor moves the trolley mechanically, using strings," said Corrodi. "This reduces noise in the field measurements introduced by the equipment."

The system uses the least amount of magnetic material possible, and the scientists tested the magnetic footprint of every single component using test magnets at the University of Washington and Argonne to characterize the overall magnetic signature of the trolley system.

The power of communication

Of the two cables pulling the trolley around the ring, one of them also acts as the power and communication cable between the control station and the measurement probes.

To measure the field, the scientists send a radio frequency through the cable to the 17 trolley probes. The radio frequency causes the spins of the molecules inside the probe to rotate in the magnetic field. The radio frequency is then switched off at just the right moment, causing the water molecules' spins to precess. This approach is called nuclear magnetic resonance (NMR).

The frequency at which the probes' spins precess depends on the magnetic field in the ring, and a digitizer on board the trolley converts the analog radio frequency into multiple digital values communicated through the cable to a control station. At the control station, the scientists analyze the digital data to construct the spin precession frequency and, from that, a complete magnetic field map.

During the Brookhaven experiment, all signals were sent through the cable simultaneously. However, due to the conversion from analog to digital signal in the new experiment, much more data has to travel over the cable, and this increased rate could disturb the very precise radio frequency needed for the probe measurement. To prevent this disturbance, the scientists separated the signals in time, switching between the radio frequency signal and data communication in the cable.

"We provide the probes with a radio frequency through an analog signal," said Corrodi, "and we use a digital signal for communicating the data. The cable switches between these two modes every 35 milliseconds."

The tactic of switching between signals traveling through the same cable is called "time-division multiplexing," and it helps the scientists reach specifications for not only accuracy, but also noise

levels. An upgrade from the Brookhaven experiment, time-division multiplexing allows for higher-resolution mapping and new capabilities in magnetic field data analysis.

Upcoming results

Both the field mapping NMR system and its motion control were successfully commissioned at Fermilab and have been in reliable operation during the first three data-taking periods of the experiment.

The scientists have achieved unprecedented precision for field measurements, as well as record uniformity of the ring's magnetic field, in this Muon g-2 experiment. Scientists are currently analyzing the first round of data from 2018, and they expect to publish the results by the end of 2020.

The scientists detailed the complex setup in a paper, titled "Design and performance of an in-vacuum, magnetic field mapping system for the Muon g-2 experiment," published in the *Journal of Instrumentation*.

More information: S. Corrodi et al, Design and performance of an in-vacuum, magnetic field mapping system for the Muon g-2 experiment, *Journal of Instrumentation* (2020). DOI: 10.1088/1748-0221/15/11/P11008

https://phys.org/news/2020-11-scientists-standard-particle-physics.html

Sat, 07 Nov 2020

Applying particle physics methods to quantum computing

By Glenn Roberts Jr.

Borrowing a page from high-energy physics and astronomy textbooks, a team of physicists and computer scientists at the U.S. Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab) has successfully adapted and applied a common error-reduction technique to the field of quantum computing.

In the world of subatomic particles and giant particle detectors, and distant galaxies and giant telescopes, scientists have learned to live, and to work, with uncertainty. They are often trying to tease out ultra-rare particle interactions from a massive tangle of other particle interactions and background "noise" that can complicate their hunt, or trying to filter out the effects of atmospheric distortions and interstellar dust to improve the resolution of astronomical imaging.

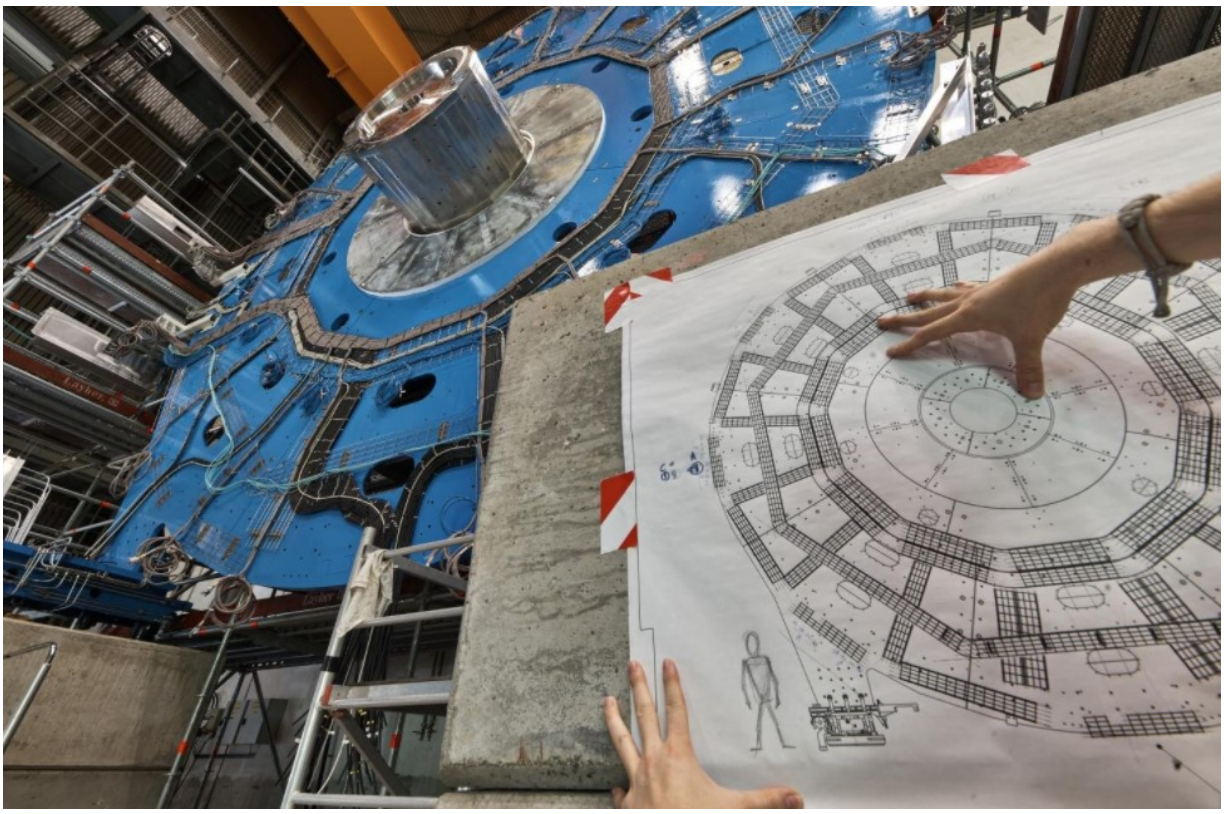
Also, inherent problems with detectors, such as with their ability to record all particle interactions or to exactly measure particles' energies, can result in data getting misread by the electronics they are connected to, so scientists need to design complex filters, in the form of computer algorithms, to reduce the margin of error and return the most accurate results.

The problems of noise and physical defects, and the need for error-correction and error-mitigation algorithms, which reduce the frequency and severity of errors, are also common in the fledgling field of quantum computing, and a study published in the journal *npj Quantum Information* found that there appear to be some common solutions, too.

Ben Nachman, a Berkeley Lab physicist who is involved with particle physics experiments at CERN as a member of Berkeley Lab's ATLAS group, saw the quantum-computing connection while working on a particle physics calculation with Christian Bauer, a Berkeley Lab theoretical physicist who is a co-author of the study. ATLAS is one of the four giant particle detectors at CERN's Large Hadron Collider, the largest and most powerful particle collider in the world.

"At ATLAS, we often have to 'unfold,' or correct for detector effects," said Nachman, the study's lead author. "People have been developing this technique for years."

In experiments at the LHC, particles called protons collide at a rate of about 1 billion times per second. To cope with this incredibly busy, "noisy" environment and intrinsic problems related to the energy resolution and other factors associated with detectors, physicists use error-correcting "unfolding" techniques and other filters to winnow down this particle jumble to the most useful, accurate data.



A wheel-shaped muon detector is part of an ATLAS particle detector upgrade at CERN. A new study applies "unfolding," or error-correction techniques used for particle detectors, to problems with noise in quantum computing. Credit: Julien Marius Ordan/CERN

"We realized that current quantum computers are very noisy, too," Nachman said, so finding a way to reduce this noise and minimize errors—error mitigation—is a key to advancing quantum computing. "One kind of error is related to the actual operations you do, and one relates to reading out the state of the quantum computer," he noted—that first kind is known as a gate error, and the latter is called a readout error.

The latest study focuses on a technique to reduce readout errors, called "iterative Bayesian unfolding" (IBU), which is familiar to the high-energy physics community. The study compares the effectiveness of this approach to other error-correction and mitigation techniques. The IBU method is based on Bayes' theorem, which provides a mathematical way to find the probability of an event occurring when there are other conditions related to this event that are already known.

Nachman noted that this technique can be applied to the quantum analog of classical computers, known as universal gate-based quantum computers.

In quantum computing, which relies on quantum bits, or qubits, to carry information, the fragile state known as quantum superposition is difficult to maintain and can decay over time, causing a qubit to display a zero instead of a one—this is a common example of a readout error.

Superposition provides that a quantum bit can represent a zero, a one, or both quantities at the same time. This enables unique computing capabilities not possible in conventional computing, which rely on bits representing either a one or a zero, but not both at once. Another source of readout error in quantum computers is simply a faulty measurement of a qubit's state due to the architecture of the computer.

In the study, researchers simulated a quantum computer to compare the performance of three different error-correction (or error-mitigation or unfolding) techniques. They found that the IBU method is more robust in a very noisy, error-prone environment, and slightly outperformed the other two in the presence of more common noise patterns. Its performance was compared to an error-correction method called Ignis that is part of a collection of open-source quantum-computing software development tools developed for IBM's quantum computers, and a very basic form of unfolding known as the matrix inversion method.

The researchers used the simulated quantum-computing environment to produce more than 1,000 pseudo-experiments, and they found that the results for the IBU method were the closest to predictions. The noise models used for this analysis were measured on a 20-qubit quantum computer called IBM Q Johannesburg.

"We took a very common technique from high-energy physics, and applied it to quantum computing, and it worked really well—as it should," Nachman said. There was a steep learning curve. "I had to learn all sorts of things about quantum computing to be sure I knew how to translate this and to implement it on a quantum computer."

He said he was also very fortunate to find collaborators for the study with expertise in quantum computing at Berkeley Lab, including Bert de Jong, who leads a DOE Office of Advanced Scientific Computing Research Quantum Algorithms Team and an Accelerated Research for Quantum Computing project in Berkeley Lab's Computational Research Division.

"It's exciting to see how the plethora of knowledge the high-energy physics community has developed to get the most out of noisy experiments can be used to get more out of noisy quantum computers," de Jong said.

The simulated and real quantum computers used in the study varied from five qubits to 20 qubits, and the technique should be scalable to larger systems, Nachman said. But the error-correction and error-mitigation techniques that the researchers tested will require more computing resources as the size of quantum computers increases, so Nachman said the team is focused on how to make the methods more manageable for quantum computers with larger qubit arrays.

Nachman, Bauer, and de Jong also participated in an earlier study that proposes a way to reduce gate errors, which is the other major source of quantum-computing errors. They believe that error correction and error mitigation in quantum computing may ultimately require a mix-and-match approach—using a combination of several techniques.

"It's an exciting time," Nachman said, as the field of quantum computing is still young and there is plenty of room for innovation. "People have at least gotten the message about these types of approaches, and there is still room for progress." He noted that quantum computing provided a "push to think about problems in a new way," adding, "It has opened up new science potential."

More information: Benjamin Nachman et al, Unfolding quantum computer readout noise, *npj Quantum Information* (2020). DOI: 10.1038/s41534-020-00309-7

https://phys.org/news/2020-11-particle-physics-methods-quantum.html

ZEENEWS

Sun, 08 Nov 2020

BCG vaccine effective in preventing COVID-19, claims new study by Indian doctor

Highlights

- ***A new study has revealed that he BCG vaccine can help in protecting people from coronavirus too.***
- ***Dr. Renu Agarwal has revealed that the BCG vaccine rapidly strengthens the body's immunity.***
- ***The findings of the study are published in Indian Journal of Applied Research.***

A new study has revealed that he BCG vaccine, which is used to protect children from Tuberculosis (TB), can help in protecting people from coronavirus too.

Dr. Renu Agarwal, Medical Superintendent (MS) of COVID-19 Hospital in Uttar Pradesh's Noida has revealed that the BCG vaccine rapidly strengthens the body's immunity. The findings of the study are published in Indian Journal of Applied Research.

In stage 1 of the study, 30 medical and paramedical staff, doing covid duty in Noida District Hospital were administered BCG in April and none of them have become positive till date, with a control group of 50 people, out of which, 8 became positive.

According to the article published in the journal, a group of 80 employees was constituted on May 1 by Dr Renu Aggarwal. In the group, 30 people were vaccinated with BCG, while 50 were asked to work at COVID-19 hospital without being vaccinated.

All these employees were tested for coronavirus every 15th day using RT-PCR. About a month later, among the 50 employees who were not vaccinated, 16 were found infected. Subsequently a second group of 130 employees was constituted on August 24 and 50 were vaccinated. All 50 medical and paramedical staff were doing COVID-19 duties and none of them have tested positive yet. A control group of 80 staff members were taken, out of which 20 tested positive. Dr Agarwal said that she got herself vaccinated too and has remained free from coronavirus so far.

Majority of the staffs who were vaccinated with BCG were suffering from diabetes, hypertension and other serious diseases. The study mentioned that the effect of BCG vaccine was seen in the employees after one month. It is to be noted that no employee was infected despite suffering from serious illnesses and they are still working in COVID-19 hospital without being infected.

According to Dr Renu Aggarwal, when coronavirus cases started coming up in India, doctors in the US, the UK, England and Italy were giving BCG vaccine to health workers. She took inspiration from here and started the research after dividing the staffs of hospital into two groups. The findings of the study were published on November 4.

(Disclaimer: This is a Medical experiment and we do not recommend or prescribe the above treatment for COVID 19. Please take legal medical advise before administrating any treatment)

https://zeenews.india.com/india/bcg-vaccine-effective-in-preventing-covid-19-claims-new-study-by-indian-doctor-2323292.html

ScienceDaily

Sat, 07 Nov 2020

COVID-19 is making tinnitus worse, new study finds

New research also indicates that hearing loss could be 'long COVID' symptom

Summary:
New research reveals that tinnitus, a common condition that causes the perception of noise in the ear and head, is being exacerbated by COVID-19. The study, which involved 3,103 participants from 48 countries, found that 40 percent of those displaying symptoms of COVID-19 simultaneously experience a worsening of their tinnitus.

New research reveals that tinnitus, a common condition that causes the perception of noise in the ear and head, is being exacerbated by COVID-19 -- as well as the measures helping to keep us safe.

The study of 3,103 people with tinnitus was led by Anglia Ruskin University (ARU), with support from the British Tinnitus Association and the American Tinnitus Association. The study involved participants from 48 countries, with the vast majority coming from the UK and the US.

Published in the journal *Frontiers in Public Health*, the research found that 40% of those displaying symptoms of COVID-19 simultaneously experience a worsening of their tinnitus.

Although the study focused on people with pre-existing tinnitus, a small number of participants also reported that their condition was initially triggered by developing COVID-19 symptoms, suggesting that tinnitus could be a 'long COVID' symptom in some cases.

Tinnitus affects an estimated one in eight adults in the UK and is associated with reduced emotional wellbeing, depression, and anxiety.

The new study also found that a large proportion of people believe their tinnitus is being made worse by social distancing measures introduced to help control the spread of the virus. These measures have led to significant changes to work and lifestyle routines.

UK respondents reported this to be a greater issue compared to people from other countries, with 46% of UK respondents saying that lifestyle changes had negatively impacted their tinnitus compared to 29% in North America.

Internal worries such as fear of catching COVID-19, financial concerns, loneliness and trouble sleeping have contributed to making tinnitus more bothersome for 32% of people overall, with external factors such as increased videocalls, noisier home environments, home schooling and increased coffee and alcohol consumption also cited by respondents. Females and the under-50s found tinnitus significantly more bothersome during the pandemic.

The study noted that as well as increasing the severity of tinnitus symptoms, the COVID-19 pandemic has also made it more difficult for people to access healthcare support for the condition. This could further increase emotional distress and worsen tinnitus symptoms, creating a vicious cycle. Before COVID-19, more than eight out of 10 UK patients were already unhappy with the treatment options available from their health professional.

Lead author Dr Eldre Beukes, a Research Fellow at Anglia Ruskin University (ARU) in Cambridge, England, and Lamar University in Texas, said: "The findings of this study highlight the complexities associated with experiencing tinnitus and how both internal factors, such as increased anxiety and feelings of loneliness, and external factors, such as changes to daily routines, can have a significant effect on the condition.

"Some of the changes brought about by COVID-19 appear to have had a negative impact on the lives of people with tinnitus and participants in this study reported that COVID-19 symptoms are worsening or, in some cases, even initiating tinnitus and hearing loss. This is something that needs to be closely examined by both clinical and support services."

David Stockdale, Chief Executive of the British Tinnitus Association and a co-author of the study, said: "With the second wave of COVID-19 and the resulting national lockdown likely to increase feelings of stress and isolation, it's vital that we don't see the same mistakes as before when it comes to community health provision for people with tinnitus.

"Poor treatment of tinnitus in the early stages often leads to much worse cases and severe tinnitus can have a huge impact on mental health. With this in mind, as the COVID-19 second wave takes hold, the healthcare system needs to ensure that anyone who develops tinnitus or experiences a worsening of their condition can access the professional healthcare support they need as quickly as possible."

Story Source:

Materials provided by **Anglia Ruskin University**. *Note: Content may be edited for style and length.*

Journal Reference:

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THE HINDU BusinessLine

Sat, 07 Nov 2020

Covid-19 vaccine: India considering phase-III trials in partner countries, says Jaishankar

Looking forward to research collaboration in vaccine development, possible joint production

New Delhi: India is on track for the development and trial of Covid-19 vaccines and is exploring the possibility of conducting phase-III clinical trials in some partner countries, teaming up for research collaboration and looking at possible joint production, Minister for External Affairs S Jaishankar has said.

"We are exploring the possibility of conducting phase-III trials in a few of our partner countries. We are also looking forward to research collaboration in the field of vaccine development. Based on willingness, we may also go for joint production of vaccines in some countries," Jaishankar said at a briefing session on Covid-19 related issues for diplomatic missions and international organisations on Friday.

"We are on track on the development and trial of vaccines," he added.

India already conducted online training sessions for nearly 90 participants from eight neighbouring countries for developing capacity in clinical trials and clinical practices, including Bangladesh and Myanmar. Based on demand, more such training courses can be conducted, the Minister said.

Several countries have been approaching India for receiving vaccine supply, and the country is willing to help. "I reiterate our Prime Minister's commitment that India's vaccine production and delivery capacity will be used to help all humanity in fighting this crisis. India will also help interested countries in enhancing their cold chain and storage capacities for the delivery of vaccines," Jaishankar said.

Drop in infection rate

Due to increase in testing numbers, contact tracing, effective isolation protocol, efficient use of hospital beds, increased availability of medical equipment, testing kits and sustained public awareness campaign, India's recovery rate is now 91.96 per cent (as on November 3) and case fatality rate has dropped to 1.49 per cent. "With progressively falling positivity rate, testing has worked as an effective tool to limit the spread of infection," he said.

In India, the daily caseload has reduced to below 50,000 from around 1,00,000 a few weeks ago, the Minister added.

Beximco deal

On the deal signed by Bangladesh's Beximco Pharmaceuticals and Serum Institute of India on Thursday to buy 30 million doses of a potential vaccine, MEA spokesperson Anurag Srivastava said that it was essentially a commercial agreement between manufacturer and buyers.

"We are of course supportive of supplies of medicines, particularly vaccines, to all friendly countries and priority is given to our neighbouring countries. This is dependent upon availability, needs and supplies," Srivastava said.

https://www.thehindubusinessline.com/economy/covid-19-vaccine-india-considering-phase-iii-trials-in-partner-countries-says-jaishankar/article33040488.ece

TIMESNOWNEWS.COM

Sat, 07 Nov 2020

India on track regarding development and trial of COVID-19 vaccines: Foreign Secretary Harsh V Shringla

India's COVID-19 caseload went past 84 lakh on November 6, 2020

KEY HIGHLIGHTS

- ***In India, 77.65 lakh people have recovered from coronavirus***
- ***COVAXIN could be launched by February***
- ***India's daily coronavirus caseload has reduced to below 50,000***

New Delhi: The Indian government on Friday made an important announcement in regards to COVID-19 vaccine development. Addressing a session on coronavirus related issues for diplomatic missions and international organisations, Foreign Secretary Harsh V Shringla said that India is on track as far as the development and trial of vaccines are concerned.

During an interaction with ambassadors and high commissioners of foreign missions in India, Shringhla assured them India will use its strength in vaccine production and delivery to help humanity in fighting the coronavirus crisis.

The foreign secretary apprised the delegates through video conferencing, saying that India is exploring the possibility of conducting phase III trials in a few of our partner countries. The country is also looking forward to research collaboration in the field of vaccine development, he said.

He assured interested foreign nations of India's help in enhancing their cold chain and storage capacities for the delivery of vaccines.

"Several countries have been approaching us for receiving vaccine supply. I reiterate our

(Representational photo) | Photo Credit: IANS

Prime Minister's commitment that India's vaccine production and delivery capacity will be used to help all humanity in fighting this crisis. India will also help interested countries in enhancing their cold chain and storage capacities for the delivery of vaccines," Shringla said while addressing the diplomatic community on COVID-19 related issues.

We are exploring the possibility of conducting phase III trials in a few of our partner countries. We are also looking forward to research collaboration in the field of vaccine development. Based on willingness, we may also go for joint production of vaccines in some countries, the MEA in its statement said.

Briefing the foreign delegates, Shringhla highlighted India's achievement in its fight against the pandemic. "In India, the daily caseload has reduced to below 50,000 from around a 100,000 a few weeks ago. We remain vigilant though and continue to devise and re-devise strategies based on our experiences across India," he said.

Meanwhile, a Reuters report said that COVAXIN, India's first indigenous vaccine against coronavirus, being developed by Bharat Biotech in partnership with the Indian Council of Medical Research (ICMR), could come as early as February 2021.

Notably, Bharat Biotech has been given permission to conduct phase 3 human trials of Covaxin.

India's total coronavirus cases mounted to 84,11,724 on November 6 and the death toll climbed to 1,24,985. In a positive sign, 77,65,966 people have recovered so far. The national recovery rate stands at 92.32 per cent and the case fatality rate was recorded at 1.49 per cent.

https://www.timesnownews.com/india/article/india-on-track-regarding-development-and-trial-of-covid-19-vaccines-foreign-secretary-harsh-v-shringla/678282