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Thu, 07 Oct 2021

LCA could be a good option for Argentine Air Force, says a source

This indigenous aircraft is an amalgamation of latest concepts and technologies like relaxed static-stability, advanced glass cockpit, integrated digital avionics systems, fly-by-wire flight control and advanced composite materials for the airframe

By Huma Siddiqui

India's indigenous Light Combat Aircraft (LCA) 'Tejas' could be an attractive option for the Argentine Air Force which is looking for multi-purpose fighters to be used for the surveillance and control of its airspace.

LCA Tejas for exports

LCA 'Tejas' together with its variants, is the smallest and lightest Multi-Role Supersonic Fighter Aircraft of its class. In fact, Argentina is looking for a supersonic fighter jet.

This single engine, Compound-Delta-Wing, Tailless Aircraft is designed and developed by Aeronautical Development Agency with Hindustan Aeronautics Limited as the principal partner along with others to meet diverse needs of its customers.

This indigenous aircraft is an amalgamation of latest concepts and technologies like relaxed static-stability, advanced glass cockpit, integrated digital avionics systems, fly-by-wire flight control and advanced composite materials for the airframe.

The engine in the aircraft are from the US.

"All these features make HAL produced LCA attractive to potential customers be it Argentina, Malaysia or any other country keen to acquire trainer/fighter in LCA class," said a source.

Adding, "In case the Malaysia deal goes ahead (the process is ongoing) it will not only give a major boost to exports for HAL, but also for India which is keen to increase Defence exports in the years to come."

Argentine Air Force

It has ageing French-designed Mirage III and V fighter jets and also US-built A-4 Skyhawk subsonic fighters. In 2015, the Mirage fighters were phased out leaving the air force of that country with supersonic fighters.

The South American nation had recently set aside \$664 million in a budget document to procure fighter jets for its Air Force. The Twitter handle of the Pakistan Consulate General in Jeddah on September 18 tweeted that Argentina had earmarked USD 664 million to buy 12 JF-17 Block III jets from Pakistan.



LCA 'Tejas' together with its variants, is the smallest and lightest Multi-Role Supersonic Fighter Aircraft of its class.

However, the Argentine Ministry of Defense denied this news and stated that no fighter aircraft of any origin had been shortlisted and that it was in the technical-economic and financial evaluation stage of five alternatives.

For several decades following the Falklands war back in 1982 against the UK, Argentina has not successfully inducted new fighter aircraft. Why? Because of the British pressure on global arms vendors.

Efforts have been made to buy the 'Gripen' of SAAB which is a Swedish company; then South Korean FA-50 trainer/light fighter was preferred. None of these could be finalized as there were several components on board these different aircraft including the ejection seat of the UK based Martin Baker.

Interestingly, the Chinese make JF-17 which are being flown by the Pakistan Air Force too have Martin Baker ejection seats.

In the previous years, Israel offered its upgraded version of its Kfir fighter jet to Argentina. Russia has also offered its MiG-35, the same one which is in race for Indian Air Force's 114 multirole fighter aircraft programme.

Views from Argentina on India-Argentine Defence Cooperation

"If the Light Combat Aircraft is preferred by the Air Force of Argentina, it will help in furthering the relationship between the two countries and could be a bridge to strengthen ties with the West that India has and with Russia too," Professor Juan Battaleme told Financial Express Online.

However, "what isn't not clear is if Argentina has economic resources to be poured for the country's forces. And I am not sure that we could use the resources that India requires to be able to have an aircraft like the HAL Tejas which is a very good plane," he opines.

According to Professor Juan Battaleme, "India has a highly developed defense sector for an average country like Argentina, and it has the capability to produce missiles, planes, and tanks. It also has an excellent relationship with Russia and an excellent relationship with the West. Therefore it will be very interesting for us to develop better cooperation with India. However, at the same time, it has a close relationship with the United Kingdom. So having a partnership with India may not happen."

Will Argentina prefer armored vehicles made in India?

"India has a lot of potential for Argentina, the problem is that it is not "into the radar", I do not know if it is for historical reasons or because in the current Argentine military radar, India is a relatively "new" actor. India has a long tradition in arms production, but for a South American country, India does not have a market penetration. India is "overshadowed" by the other alternatives. We can say that there is potential but I think that India would have to make an effort to get closer not only to Argentina but also to the rest of the countries in the region where, possibly India, has a more than interesting market," Prof Battaleme concludes.

According to Soher El Zucaria, Member of the Argentina Parliament, "A Memorandum of Understanding on Defense Cooperation was established between both countries, that promotes the exchange of knowledge in the field of Science, Technology, Production and Logistics for Defense, as well as sharing experiences on issues of United Nations Peacekeeping Missions."

"Argentina and India are also strategic allies on the fight against terrorism. Both countries have suffered terrorist attacks and, as Argentina sees it, multilateral cooperation is vital to combat such threats. For sure, our two countries can work together to continue to foster multilateral cooperation to combat terrorism," says Soher El Zucaria.

<https://www.financialexpress.com/defence/lca-could-be-a-good-option-for-argentine-air-force-says-a-source/2345231/>

From tanks to aircraft, India clears a whopping \$7.5b worth of military equipment under ‘Make in India’ Initiative

By Shreya Mundhra

India, which has been vying for self-reliance in the defense sector, has signed several contracts and cleared multiple projects to boost military capability with locally produced weapons and systems in less than a month.

While this is a major push to the Modi government’s Atmanirbhar Bharat (self-reliant India) campaign, qualms regarding the quality of some indigenous equipment still remain.

Import Ban

Giving an example to highlight the need for being self-reliant in defense, General V.P. Malik (retired), said that during the 1999 Kargil war, the Indian Army had ordered two regiments of 155 mm Denel guns from South Africa. However, when the weapons were to be delivered, they said they didn’t have them.

To avoid tricky situations like these, indigenization in this crucial sector is of prime importance. This is the path the current government has taken as well.

Under the present administration, India’s Defense Ministry first imposed an import ban on 101 military items in August 2020. It then added 108 more items to the existing list a year later to give further impetus to self-reliant defense manufacturing.

The import ban list comprises systems, sensors, weapons, and ammunition such as mine-protected vehicles, helicopters, mini-UAVs, wheeled armored platforms, tank engines, border surveillance systems, next-generation corvette, and helicopter launched anti-tank guided missiles among others. Import substitution of certain ammunition has been given special focus.

Speaking to The EurAsian Times, Major General Rohit Gupta (retd) said, “It is important to understand that an import ban on 209 military equipment does not imply that the equipment would be 100% indigenous. The percentage of minimum acceptable Indigenous Content (IC) will continue to be dictated by the procurement category which ranges from 50-60% IC.”

“Some niche technologies are only available with a select few countries. We would need both the foreign companies and, in most cases, their government approval for the technology. At that too, in most cases, the ToT is not given.

In such cases, 100% indigenization is not possible, at this juncture, and that component will have to be imported and integrated into the complete system with the foreign OEMs assistance. Yes, at a later stage, we can progress towards greater indigenization as our technology thresholds improve,” Gupta, currently, the head of aerospace & defense at Primus Partners, added.

FDI Threshold

Alongside this, the government also decided to increase foreign direct investment (FDI) in the defense sector. The idea is to increase domestic defense production, develop new technology in India and facilitate the growth of the private sector in defense production.



Defense Minister Rajnath with India’s top military brass during a webinar on the ‘Atmanirbhar Bharat’ initiative. (via Twitter)

In a Press Note in September 2020, the Department for Promotion of Industry and Internal Trade announced the increase of FDI in the defense sector from 49% to 74% under the automatic route.

Maj Gen. Gupta (retd) opined that an increase of FDI up to 74% through the direct route in the defense sector has the potential to provide impetus to foreign companies to invest and manufacture in India. This will allow a complete higher technology threshold eco-system of indigenous Tier 2 & 3 suppliers to come up.

A few impediments like the restriction in the permissible category of procurement, for such companies, will have to be resolved to make it a viable investment opportunity.

For the financial year 2020-2021, the Defense Ministry also created a separate budget head for domestic capital procurement. It has allocated a budget of INR 52,000 crore for domestic procurement. Previously, the capital procurement budget consisted of both domestic and foreign procurement.

The Defence Acquisition Procedure (DAP) 2020 increased the requirement of indigenous content in all categories of defense procurement. It also proposed other measures — such as increasing indigenous availability of high-end military materials, using locally-made software in equipment/systems, and boosting innovation by start-ups and micro, small and medium enterprises (MSMEs)— to increase indigenization.

Local Manufacturers Get A Boost

In less than a month, New Delhi cleared defense purchases worth almost ₹54,000 crores (around \$7.5B). In late September, a ₹22,000-crore (around \$3B) contract for 56 C-295 medium transport aircraft was signed between Airbus Defence and Space and India's Defense Ministry.

This contract, aimed to modernize the Indian Air Force's transport fleet, will be jointly executed by Airbus Defence and Space and Tata Advanced Systems Ltd. As The EurAsian Times previously reported, Airbus will provide the first 16 aircraft in ready-to-fly condition from Spain while Tata will assemble the other 40 in India.

Just a day before the C-295 deal was signed, the ministry had placed an order worth ₹7,523 crores (one billion USD approx) with Heavy Vehicles Factory in Avadi, Tamil Nadu. This was a contract for 118 Arjun Mk-1A tanks.

Last month, the Cabinet Committee on Security had also cleared a Defence Research and Development Organisation (DRDO) proposal to develop a new airborne early warning and control aircraft for the Indian Air Force (IAF) using Airbus jets bought from Air India. The deal is reportedly worth close to ₹11,000 crores (\$1.5B).

India's apex procurement body, the Defence Acquisition Council, granted its acceptance of necessity (AoN) for defense purchases worth ₹13,165 crores (\$1.7.4B) last week. This particular procurement will include 25 advanced light helicopters Mark III.

“This 54,000 crore worth of procurement will give a fillip to the domestic industry and empower them to invest in development including tie-ups with foreign OEMs for higher levels of technologies and quality manufacture sought by the defense forces,” Maj Gen. Gupta (retd.) said.

Persisting Problems

Not everything has been smooth-sailing. For instance, the Indian Army's modernization plan to procure over 3,000 howitzers by the mid-2020s has been facing issues.

The homemade Advanced Towed Artillery Gun System (ATAGS), and Dhanush gun that the army had planned on procuring under the Field Artillery Rationalisation Programme (FARP), have run into problems too.

The ATAGS' issues begin with its design and development. It suffered major setbacks in the recent summer fire trials and could not achieve certain parameters set out by the army. There are issues related to the weight of these guns that also need to be addressed. The ATAGS will have to go through more modifications.

The induction of Dhanush began in April of 2019. However, by 2019-2021, only 12 of the long-range artillery guns have been delivered. To comprise a full regiment, 18 guns are required.

On the upside, the K9 Vajra Howitzers, made under a joint venture between India's L&T and a consortium of South Korean Companies has been the most successful one so far.

India plans on buying more of these tracked guns for its Army. US-based BAE Systems-made M-777 guns have been assembled in India by Mahindra Defence. The deliveries have gotten delayed due to the pandemic.

“The strategic partnership route is the way ahead for all major equipment procurement. It assures the selected domestic company return on its investments, enables financing, enhances R&D and technology tie-ups with foreign OEMs is facilitated on the GtoG route. government. The Tier 2 & 3 eco-system, feeding the contracted company, is also facilitated with assured orders,” according to Gupta.

“While there have been slippages in defense procurement in the past, with remedial measures put in by MoD, we are optimistic that the domestic defense sector will experience growth. The path to indigenization will not be easy, but in the long run, it will serve the military and Nation well in their endeavor to modernize and achieve self-sustenance,” said the General before signing off.

<https://eurasianimes.com/from-tanks-to-aircraft-india-clears-a-whopping-7-5b-worth-of-military-equipment-under-make-in-india-initiative/>

News Tree

Thu, 07 Oct 2021

Now the enemy will tremble seeing the strength of India, 233 fighter aircraft will join the Air Force fleet, know how long the process will be completed?

By Chandan Sen

233 state-of-the-art fighter aircraft will be inducted in the Indian Air Force fleet within the next ten years. Preliminary process for procurement of new aircraft has been started. The government plans to manufacture most of the fighter jets in the country. On one hand, this will clear the way for the Air Force to remove the old MiG planes. At the same time, the self-reliant India campaign will also get impetus by the manufacture of fighter planes in the country.

According to the Defense Ministry, the procurement of 83 Tejas Light Combat Aircraft has already been approved. These aircraft are to be manufactured by HAL and its state-of-the-art version LCA-1A will be procured for the IAF. However, the IAF has already procured 22 aircraft of its initial version. The Defense Ministry has also sanctioned Rs 38,000 crore for this. This version of the LCA will be equipped with state-of-the-art weapons.

A day earlier, the Chief of the Air Staff, Air Chief Marshal VR Choudhary said that the preliminary process for procurement of 114 Multi Role Fighter Aircraft (MRFA) has been started. Proposals were invited for this, which will be decided after studying. These aircraft will also be manufactured in the country itself. Whichever company will get the contract to supply them, they



will have to manufacture them in the country itself. The purpose of the government behind this is also to promote Make in India.

Let us inform that recently 56 transport aircraft for the Air Force have also been procured from Airbus on the condition of Make in India. Out of this, 40 aircraft will be made indigenously. Apart from this, the government is also constantly being asked to buy 36 more Rafale from the Air Force. However, the government has not accepted it yet. But in view of the challenges being faced by Pakistan and China, the proposal is likely to be approved soon.

Less than 600 planes now

According to sources, the IAF currently has a little less than 600 aircraft. But according to the standards of the Air Force, there should be about 756 aircraft i.e. 42 squadrons. Each squadron consists of 18 fighter aircraft. At present the number of squadrons is close to 32. Thus the acquisition of new aircraft will increase the number of modern fighter aircraft of the Air Force in the coming times. But LCA Tejas will be available to the Air Force only after 2024. The supply of multi-role fighter jets is also unlikely to start before 2030. There is no deal on Rafale yet, but their supply is not possible before five years.

The challenge of phasing out old planes

Meanwhile, the challenge before the Air Force is that it has to phase out the old aircraft. There are 4 squadrons of MiGs. In which about 65 aircraft are left. The Air Chief has said to remove them from service within the next three-four years. Jaguar, Mirage aircraft are also getting old. The cost of upgrading them is only slightly less than buying a new aircraft. Therefore, the challenge is that despite the arrival of new aircraft, the number of squadrons will not be more than 35 due to the reduction of old aircraft. Whereas during 2001-02, the IAF's squadron had reached 42.

<https://news.newstree.co.in/news/now-the-enemy-will-tremble-seeing-the-strength-of-india-233-fighter-aircraft-will-join-the-air-force-fleet-know-how-long-the-process-will-be-completed-278656/>

CUTN's satellite campus to come up in Trichy soon

Tiruvarur: A satellite campus of the Central University Tamil Nadu (CUTN) in Tiruvarur will be set up in Trichy soon, university vice-chancellor M Krishnan has said. Speaking to reporters after the sixth convocation of the university here on Wednesday, the vice-chancellor said that chief minister M K Stalin had promised his support to establish the campus in Trichy.

“We met the chief minister last week to discuss the matter. He promised to provide all necessary help. We need around 25 acres of land for the purpose. The chief minister also promised to acquire the required land. All these efforts were made to benefit more students from Tamil Nadu,” the vice-chancellor further said.

Regular classes, which had been suspended for months following the outbreak of Covid-19, will resume from October 20.

“Students of UG third year and PG final year will be asked to attend the class. Those coming to the classes should take both jabs and should also submit the relevant certificates when coming to class,” he said.

A separate department for sports will be created soon at the University and a special fund has been requested for this, he said.

Earlier, Union minister of education and skill development and entrepreneurship Dharmendra Pradhan hoped that the students' dreams would encompass the idea of doing something to better the lives of people less fortunate.

In a written message to students on the occasion of the sixth annual convocation via live streaming, he expressed hope that the country is going to witness a massive transformation in the education landscape in the years to come because of the various reforms.

He also expressed his pleasure over the fact that the university is revamping the syllabi of various programmes as per the outcome based education (OBE) format.

G Sathesh Reddy, secretary, department of defence R&D and chairman, DRDO, ministry of defence highlighted the need for start-ups in the present time. He called upon students to come up with innovative ideas to make available first of its kind technologies by doing core research in academic institutions and convert them into applied research in institutes such as DRDO, he said.

The Chancellor of the university, G Padmanaban, presided over the event and conferred the degrees to 1,564 students with an overall pass percentage of 97.4%. Degree certificates will be sent to the students by post, the authorities said.

<https://timesofindia.indiatimes.com/city/trichy/cutns-satellite-campus-to-come-up-in-trichy-soon/articleshow/86820768.cms>

तिरुवारूर विवि की शाखा खुलेगी तिरुचि में: कुलपति कृष्णन

By P S Vijay Raghavan

- विवि का वुर्चअल दीक्षांत समारोह
- तिरुचि में २५ एकड़ के क्षेत्र में बनेगा नया परिसर

तिरुवारूर. तमिलनाडु केंद्रीय विश्वविद्यालय (सीयूटीएन) के कुलपति प्रो. एम. कृष्णन ने बुधवार को जानकारी दी कि तिरुचि में करीब 25 एकड़ के क्षेत्र में विवि की एक शाखा स्थापित की जाएगी।

तिरुवारूर के नीलकुड़ी स्थित विवि परिसर में छठा दीक्षांत समारोह आयोजित हुआ जिसमें केंद्रीय शिक्षा और कौशल विकास मंत्री धर्मेन्द्र प्रधान मुख्य अतिथि और डीआरडीओ के चेयरमैन डा. जी. सतीश रेड्डी विशिष्ट अतिथि थे। वुर्चअल समारोह में स्नातकों और परास्नातकों को पदवियां दी गईं।

डॉ. रेड्डी ने वर्तमान समय में स्टार्ट-अप की आवश्यकता पर प्रकाश डाला। उन्होंने छात्रों से अनुरोध किया कि शैक्षणिक संस्थानों में मूल अनुसंधानों द्वारा नवाचार के साथ नई प्रौद्योगिकियों का विकास कर उनको डीआरडीओ के समकक्ष बनाएं। ताकि बड़े पैमाने पर उत्पादन का फायदा उद्योग जगत को मिल सके। इस अवसर पर विश्वविद्यालय के कुलाधिपति प्रो. जी. पद्मनाभन और विश्वविद्यालय प्रो. एम. कृष्णन व अन्य उपस्थित थे।

सीएम स्टालिन से आश्वासन

कुलपति एम. कृष्णन ने पिछले सप्ताह मुख्यमंत्री एमके स्टालिन से हुई भेंट का उल्लेख करते हुए कहा कि तिरुचि में २५ एकड़ में विवि की शाखा खोलने का निर्णय हुआ है। मुख्यमंत्री ने केंद्रीय विश्वविद्यालय को हर संभव सहायता मुहैया कराने का वादा किया। तमिलनाडु के अधिक से अधिक छात्रों को लाभ पहुंचाने के लिए यह प्रस्ताव रखा गया है। केंद्र सरकार से केंद्रीय विश्वविद्यालय को आवश्यक वित्तीय आवंटन किया जा रहा है। तमिलनाडु केंद्रीय विश्वविद्यालय में जल्द ही खेलों के लिए एक अलग विभाग होगा और हमने इसके लिए विशेष आवंटन की मांग की है।

२० अक्टूबर से कक्षाएं

समारोह के बाद कुलपति ने संवाददाता सम्मेलन को संबोधित किया कि कोरोना की वजह से बंद कक्षाओं का संचालन २० अक्टूबर से होगा। कक्षाएं पहले केवल स्नातक तृतीय वर्ष और स्नातकोत्तर अंतिम वर्ष के छात्रों के लिए शुरू होंगी। कोरोना टीकों की दोनों खुराक ले चुके विद्यार्थियों को ही अनुमति दी जाएगी। उन्होंने बताया कि 1,596 विद्यार्थियों को पंजीकृत डाक से पदवियां पहुंचाई जाएंगी।



<https://www.patrika.com/chennai-news/new-campus-of-cutn-at-trichy-and-convocation-7107859/>

COVID 19: DRDO's Contribution



Press Information Bureau
Government of India
Prime Minister's Office

Wed, 06 Oct 2021 2:35PM

PM to dedicate to the nation PSA Oxygen Plants established under PM CARES on 7th October

PM to dedicate 35 PSA Oxygen Plants across 35 States and UTs

PSA Oxygen Plants now commissioned in all districts of the country

Prime Minister Shri Narendra Modi will dedicate to the nation 35 Pressure Swing Adsorption (PSA) Oxygen Plants established under PM CARES, across 35 States and Union Territories, in an event to be held at AIIMS Rishikesh, Uttarakhand on 7th October, 2021 at 11 AM. With this, all districts of the country will now have commissioned PSA Oxygen Plants. Prime Minister will also address the gathering on the occasion.

Till now, a total of 1224 PSA Oxygen Plants have been funded under PM CARES all across the country, out of which more than 1100 Plants have been commissioned, providing an output of over 1750 MT oxygen per day. It is a testimony of the proactive measures taken by the Government to augment India's medical oxygen generation capacity since the advent of Covid-19 pandemic.

The project to commission a PSA oxygen plant in each district of the country was executed while dealing with complex challenges of hilly areas, islands and territories with difficult terrain.

Operations and maintenance of these plants have been ensured by training more than 7,000 personnel. They come with an embedded Internet of Things (IoT) device for real time monitoring of their functioning and performance through a consolidated web portal.

Governor & Chief Minister of Uttarakhand, along with Union Health Minister will also be present on the occasion.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1761388>



पत्र सूचना कार्यालय
भारत सरकार

प्रधानमंत्री कार्यालय

Wed, 06 Oct 2021 2:35PM

प्रधानमंत्री 7 अक्टूबर को पीएम केयर्स के तहत स्थापित पीएसए ऑक्सीजन संयंत्र राष्ट्र को समर्पित करेंगे

प्रधानमंत्री 35 राज्यों और केन्द्रशासित प्रदेशों के 35 पीएसए ऑक्सीजन संयंत्रों को समर्पित करेंगे

पीएसए ऑक्सीजन संयंत्र अब देश के सभी जिलों में चालू हो गए हैं

प्रधानमंत्री श्री नरेन्द्र मोदी 7 अक्टूबर, 2021 को सुबह 11 बजे उत्तराखंड में एम्स ऋषिकेश में आयोजित होने वाले एक कार्यक्रम में 35 राज्यों और केन्द्रशासित प्रदेशों में पीएम केयर्स के तहत स्थापित 35 प्रेशर स्विंग ऐड्सॉर्प्शन (पीएसए) ऑक्सीजन संयंत्र राष्ट्र को समर्पित करेंगे। इससे देश के सभी जिलों में अब पीएसए ऑक्सीजन संयंत्र चालू हो जाएंगे। इस मौके पर प्रधानमंत्री सभा को भी संबोधित करेंगे।

अब तक, पूरे देश में कुल 1,224 पीएसए ऑक्सीजन संयंत्रों को पीएम केयर्स के तहत वित्तपोषित किया गया है, जिनमें से 1,100 से अधिक संयंत्रों को चालू किया गया है, जिससे प्रतिदिन 1,750 मीट्रिक टन से अधिक ऑक्सीजन का उत्पादन होता है। यह कोविड-19 महामारी शुरू होने के बाद से भारत की चिकित्सा ऑक्सीजन उत्पादन क्षमता को बढ़ाने के लिए सरकार द्वारा उठाए गए सकारात्मक उपायों का प्रमाण है।

देश के प्रत्येक जिले में एक पीएसए ऑक्सीजन संयंत्र चालू करने की परियोजना को पहाड़ी क्षेत्रों, द्वीपों और दुर्गम भू-भाग वाले क्षेत्रों की जटिल चुनौतियों से निपटने के उद्देश्य से क्रियान्वित किया गया था।

7,000 से अधिक कार्मिकों को प्रशिक्षण देकर इन संयंत्रों का संचालन और रखरखाव सुनिश्चित किया गया है। वे एक सशक्त वेब पोर्टल के माध्यम से अपने कामकाज एवं निष्पादन की तत्काल निगरानी के लिए एक एम्बेडेड इंटरनेट ऑफ थिंग्स (आईओटी) डिवाइस के साथ होते हैं।

इस अवसर पर केन्द्रीय स्वास्थ्य मंत्री के साथ-साथ उत्तराखंड के राज्यपाल और मुख्यमंत्री भी मौजूद रहेंगे।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1761429>



పిఎమ్ కేర్స్ లో భాగం గా ఏర్పాటు చేసినపిఎస్ఎ ఆక్సీజన్ ఫ్లాంటుల ను అక్టోబరు 7న దేశ ప్రజల కు అంకితం చేయనున్న ప్రధాన మంత్రి

35 రాష్ట్రాలు మరియు కేంద్రపాలిత ప్రాంతాలలో 35 పిఎస్ఎ ఆక్సీజన్ ఫ్లాంటుల ను ప్రధానమంత్రి అంకితం చేస్తారు

దేశం లోని అన్ని జిల్లాల లో ప్రస్తుతం పిఎస్ఎఆక్సీజన్ ఫ్లాంటులు పని చేస్తున్నాయి

పిఎమ్ కేర్స్ లో భాగం గా 35 రాష్ట్రాలు మరియు కేంద్ర పాలిత ప్రాంతాల లో ఏర్పాటైన 35 ప్రైవేట్ సింగిల్ అడ్ సార్ప్ శన్ (పిఎస్ఎ) ఆక్సీజన్ ఫ్లాంటుల ను ప్రధాన మంత్రి శ్రీ నరేంద్ర మోదీ 2021 అక్టోబర్ 7న ఉదయం 11 గంటల కు ఉత్తరాఖండ్ లోని ఎఐఐఎమ్ఎస్ రుషీకేశ్ లో జరుగనున్న ఒక కార్యక్రమం లో దేశ ప్రజల కు అంకితం చేయనున్నారు. దీనితో, దేశం లోని అన్ని జిల్లాలు ఇక పిఎస్ఎ ఆక్సీజన్ ఫ్లాంటులను కలిగివున్నట్లు అవుతుంది. ఈ సందర్భం లో ప్రధాన మంత్రి సభికుల ను ఉద్దేశించి ప్రసంగిస్తారు.

ఇంతవరకు, పిఎమ్ కేర్స్ ద్వారా దేశవ్యాప్తం గా మొత్తం 1224 పిఎస్ఎ ఆక్సీజన్ ఫ్లాంటుల కు ఆర్థిక సహాయాన్ని అందించడమైంది. వీటిలో 1100లకు పైగా ఫ్లాంటులు ఇప్పటికే పని చేస్తున్నాయి. వీటి ద్వారా ప్రతి రోజు 1750 ఎమ్ టి కి పైగా ఆక్సీజన్ ఉత్పత్తి అవుతోంది. ఇది కోవిడ్-19 విశ్వమారి తలెత్తినప్పటి నుంచి భారతదేశం లో చికిత్స కు వినియోగించే ఆక్సీజన్ ఉత్పత్తి సామర్థ్యాన్ని పెంచడం కోసం ప్రభుత్వం ముందుచూపు తో చేపట్టిన చర్యల కు ఒక నిదర్శనం గా ఉంది.

దేశం లో ప్రతి ఒక్క జిల్లా లో ఒక పిఎస్ఎ ఆక్సీజన్ ఫ్లాంటు ను ఏర్పాటు చేయడం కోసం తలపెట్టిన ఒక ప్రాజెక్టు ను కార్యచరణ లోకి తీసుకు రావడం లో భాగం గా పర్యత ప్రాంతాలు, ద్వీపాలు, దుర్గమమైన ప్రదేశాలు కలిగిన భూ భాగాల వంటి క్లిష్ట సవాళ్ళ ను కూడా అధిగమించడం జరిగింది.

7,000 కు పైగా సిబ్బంది కి శిక్షణ ను ఇవ్వడం ద్వారా ఈ ఫ్లాంటుల కార్యకలాపాలకు, నిర్వహణ కు పూచీ పడడం జరిగింది. సిబ్బంది పనితీరు ను వాస్తవ కాల ప్రాతిపదిక న పర్యవేక్షించడం కోసం ఒక ఎంటెడెడ్ ఇంటర్ నెట్ ఆఫ్ థింగ్స్ (ఐబిటి) ఉపకరణాన్ని, అలాగే ఒక ఏకీకృత వెబ్ పోర్టల్ ను ఉపయోగించడం జరుగుతున్నది.

ఈ కార్యక్రమం లో కేంద్ర ఆరోగ్య మంత్రి తో పాటు, ఉత్తరాఖండ్ గవర్నర్, ఉత్తరాఖండ్ ముఖ్యమంత్రి లు కూడా పాల్గొంటారు.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1761437>

1,168 oxygen plants developed by DRDO to be dedicated on Thursday

PM Modi will virtually dedicate several oxygen plants

By Pradip R Sagar

When the second wave of COVID-19 caused distress across the country, primarily due to the shortage of medical oxygen, the Centre turned to the country's premier defence scientists. The DRDO was tasked to set up 1,200 oxygen plants on war footing. The defence research organisation pooled in all its resources, at times pulling out scientists involved in missile development, to focus on completing the task at hand.

On October 7 (Thursday), 1,168 oxygen plants, developed by DRDO, will be dedicated across the country. While 43 of these will be dedicated by PM Modi, the remaining will be done by public representatives and local administration.

The PM will visit poll-bound Uttarakhand on Thursday where he will inaugurate an oxygen plant at the All India Institute of Medical Sciences (AIIMS) in Rishikesh. Uttarakhand will go to polls next year.

Apart from the oxygen plant at AIIMS Rishikesh, PM Modi, who completes 20 years of service in a constitutional post ever since he took oath as Gujarat chief minister in the year 2001, will virtually dedicate 42 other plants across the country. Except for Mizoram and Andaman and Nicobar islands, medical oxygen plants are ready for all states and Union territories.

The shortage of oxygen during the second wave of the pandemic had led to several deaths.

In a first of its kind task, DRDO used onboard oxygen generation technology for light combat aircraft (LCA) Tejas for the medical oxygen plants (MOP). All these plants can generate 1,000 litres of oxygen per minute.

The DRDO transferred its MOP technology to Bengaluru-based Tata Advanced Systems Limited and Coimbatore-based Trident Pneumatics along with other private industries to set up plants across the nation.

"The prime minister's office expressed confidence in DRDO's capability and the organisation has delivered it on time," said a key official, who added that every laboratory of DRDO was directed to provide all possible support for setting up medical oxygen plants.

Till now, a total of 1,224 medical oxygen plants have been funded under PM CARES across the country, out of which more than 1,100 plants have been commissioned, providing an output of over 1,750 MT oxygen per day.

During the first wave of COVID-19 in 2020, DRDO had come out with multiple inventions, including sanitizers, masks and PPE kits. It fast-tracked the design and development of N95, N99 mask and many other technologies for disinfection and protection from COVID-19. These technologies were transferred to many industries for free for all COVID related technologies.

<https://www.theweek.in/news/india/2021/10/06/1168-oxygen-plants-developed-by-drdo-to-be-dedicated-on-thursday.html>



Final touches being made to the DRDO's oxygen plant at RML hospital, Delhi | Sanjay Ahlawat

Delhi temples gear up to receive devotees in Navratri

New Delhi [India], October 6 (ANI): Preparations at temples in Delhi is in full swing ahead of the Navratri festival as the Delhi government permitted the reopening of religious places for devotees from October 1 until October 15 with strict compliance to COVID-19 guidelines.

Dr Kishore Chawla, the chief executive officer of Chattarpur Mandir Trust, said, "The preparation for Navaratri is being done. The temple will be decorated like a bride. The festival of lights will also take place in the temple and the whole temple will be lightened. The gate of the goddess 'Mahishasura Mardini' will be open tomorrow for devotees."

Talking about the measures Chattarpur temple will be taking in view of the COVID-19 pandemic, Chawla said, "Keeping the government's COVID guidelines in mind, the temple administration has made all kinds of arrangements and local DCP and district magistrate have already visited the temple. A sanitiser tunnel has been installed at the entry gate. After passing the entry point, the thermal screening will be done."

"For social distancing, shift-wise sevadars will be performing their duties at parking points, langar. During the second wave, DRDO had develop a UV machine that will be there in all our courtyards. There will be only one entry point and one exit point. As we have a large area, so in case of crowd gathering, we have cemented holding areas. We will keep the devotees there. Everyone will be released from there to offer prayer at the temple. For queue management, sevadar will be there and help the devotees to maintain proper social distancing. Circles have also been made. Hand sanitisers are kept at different places. Masks will be given to the devotees just in case they don't have one. Langar will be distributed to the devotees in a packed container," he added.

Chawla further said that the temple will be broadcasting the 'aarti' on our Youtube and Facebook channels and requested the people from age of 0-12 and above 65 years to offer prayers at home and avoid gathering.

<https://sg.news.yahoo.com/delhi-temples-gear-receive-devotees-133149478.html>



Visual of Delhi's Kalkaji Mandir (Photo/ANI)

घर-घर में होगा मां दुर्गा का आगमन, मंदिर सजे

नई दिल्ली: शारदीय नवरात्र पर मां दुर्गा के आगमन के लिए राजधानी के घरों में लोगों ने पूरी तैयारियां कर ली हैं। वहीं दिल्ली के सभी छोटे-बड़े मंदिरों को कोविड गाइडलाइंस का पालन करते हुए भक्तों के लिए खोल दिया गया है। मंदिर प्रशासन द्वारा झंडेवाला देवी मंदिर, कालकाजी मंदिर व छत्तरपुर मंदिर को बेहद खूबसूरत फूलों व रंगीन बल्बों से सजाया गया है। वहीं भक्तों के दर्शन के साथ ही कई प्रकार की विशेष तैयारियां भी की गई हैं। आइए जानते हैं कि क्या तैयारियां हैं मंदिरों में।

प्राचीन झंडेवाला देवी मंदिर

झंडेवाला देवी मंदिर के सचिव कुलभूषण आहुजा ने बताया कि गाइडलाइंस के अनुसार तैयारियां पूरी हैं भक्त दर्शन तो कर पाएंगे लेकिन प्रसाद व अन्य भेंट चढाने की मनाही रहेगी। बिना मास्क प्रवेश नहीं मिलेगा। मंदिर के प्रत्येक द्वार पर चरण पादुका स्टैंड बनेंगे, जहां भक्त अपने जूते-चप्पल रख सकेंगे। भक्तों के वाहन रानी झांसी मार्ग, फ्लैटिड फैक्ट्री परिसर में निःशुल्क पार्किंग की व्यवस्था रहेगी। आपात स्थिति को ध्यान में रखते हुए 150 सीसीटीवी कैमरे लगाए गए हैं। जिन की निगरानी पुलिस के सहयोग से विशेष रूप से बने एक कंट्रोल रूम से की जाएगी ताकि असामाजिक तत्वों पर ध्यान रखा जा सके। नवरात्र के समय हर वर्ष अलग-अलग स्थानों से भक्त मां की ज्योत लेने आते हैं उनकी हर प्रकार की सुविधा का प्रबंध मंदिर की ओर से किया जाएगा।

आद्यकात्यायनी छत्तरपुर मंदिर

छत्तरपुर मंदिर के सीईओ डॉ. किशोर चावला ने बताया कि इस बार जो भक्त विजिट नहीं कर पा रहे उनके लिए डीडी नेशनल पर लाइव आरती प्रसारित की जाएगी। भीड़ को कंट्रोल करने के लिए स्टाॅट दिए जाने की तैयारी ऐप के जरिए की जा रही है। भक्त फूलमाला, प्रसाद नहीं चढा पाएंगे। डीआरडीओ ने अल्ट्रा वायलेट मशीन बनाई थी जोकि मंदिर परिसर में लगी हुई हैं। उनके जरिए 99 फीसदी मंदिर कोविड फ्री है। दो सेनेटाइजर टनल इंटी प्वाइंट पर लगाए गए हैं इसके अलावा जगह-जगह हैंड सेनेटाइजर लगाए गए हैं। थर्मल स्कैनिंग होगी, जो मास्क पहनकर नहीं आएंगे उन्हें मास्क दिए जाएंगे। 60 वर्ष से अधिक व 12 साल से कम उम्र के लोगों को मंदिर में प्रवेश नहीं दिया जाएगा। मां आद्यकात्यायनी व महिषासुर मर्दनी की मूर्ति को डायमंड व गोल्ड के आभूषणों से सजाया गया है।

<https://www.navodayatimes.in/news/khabre/maa-durga-to-arrive-from-house-to-house-temple-decorated/183132/>

THE TIMES OF INDIA

Thu, 07 Oct 2021

After NDA, doors of military school, college open for girls

New Delhi: After allowing entry of women candidates to the National Defence Academy, the Centre has now agreed to allow girls to get admission in defence ministry-run Rashtriya Indian Military College and Rashtriya Military Schools, which have so far been all-boys educational institutions.

In an affidavit, the government said that to facilitate the induction of girls, there is need for authorising additional vacancies along with other associated infrastructure and administrative support in RIMC, and it would be done in a phased manner. The government said that girls will be allowed to appear in the all-India entrance examination to be conducted next year. All states and UTs compete for an average 25 seats bi-annually for RIMC.



The government said that in the first phase, the capacity will be increased from 250 to 300 by inducting five girls every six months. “It is submitted that girls will be allowed to take the entrance exam scheduled in June 2022 for entry into RIMC,” it said.

“In phase 2, capacity will be increased from 300 to 350 to induct 10 girls every six months, and at the end of the expansion, RIMC will have 250 boys and 100 girls,” it said, adding that final expansion will be done by 2027.

<https://timesofindia.indiatimes.com/india/after-nda-doors-of-military-school-college-open-for-girls/articleshow/86825107.cms>

Thu, 07 Oct 2021

Army Chief Gen Naravane releases theme song for International Kargil Marathon

Pune, Oct 6 (UNI) A theme song prepared for an upcoming International Kargil Marathon has been released at the hands of Army Chief General M M Naravane.

The International Kargil Marathon has been organized jointly by city-based social organisation Sarhad and the Ladakh Police on the occasion of National Unity Day on Oct 31 at Kargil.

The song, prepared by Sarhad Music, was released on the Sarhad Musics YouTube channel in a virtual inauguration ceremony by Gen Naravane on Tuesday evening.

Sung by noted singer Padmashri Shankar Mahadevan, the song has been penned by Dr Prabhakiran Jain and set to music by Mazhar Siddiqui. It upholds national unity and the spirit of the sports.

Speaking on the occasion, Gen Naravane lauded city businessman Sanjay Nahar of Sarhad for striving for national unity, peace, and development for the last 30 years in terror-stricken bordering regions of the country.

Sarhad has played a major role in taking ahead the objectives of the central government and Army, he said.

The Indian Army supports the Kargil Marathon which is organized by Sarhad in association with Kargil Police and Kargil district administration, the Army chief added.

Leh Police chief Satish Kandhare said on the occasion that this marathon is a major step towards national unity through sports at a place like Kargil (Leh), a high altitude and difficult place.

<http://www.uniindia.com/army-chief-gen-naravane-releases-theme-song-for-international-kargil-marathon/west/news/2526761.html>



Press Information Bureau
Government of India

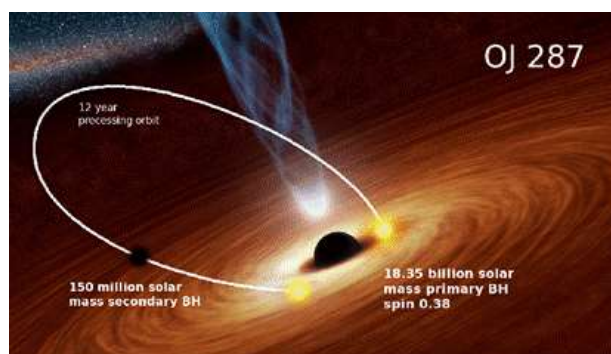
Ministry of Science & Technology

Wed, 06 Oct 2021 3:26PM

Blazar 3.5 billion light-years from Earth provides better understanding of physics powering their massive optical flare

Scientists tracking a blazar 3.5 billion light-years from Earth that stands out with its quasi-periodic optical outbursts over trillion times the Sun's luminosity, going back approximately 120 years, have traced the reason behind the sudden increase in its flux states. With the source of its optical flare, which was earlier understood to be a binary supermassive black hole, the new study found that the source to be more complex. This study will provide a better understanding of blazars and the physics powering the source of their optical flare.

Blazars are one of the brightest sources in the Universe. A special class of these objects are called BL Lacs, which show rapid and large variability in emission. A blazar called OJ 287, whose central supermassive black hole is among the largest known, belongs to this class. However, the origin of its optical flare is unique and different from other BL Lacs. It had been proposed as a binary black hole system, where one supermassive black hole has been orbiting around the central black hole with an orbital period of almost 12 years (result from century-long optical monitoring). The underlying physical mechanism of optical flaring has remained a puzzle for a long time, mainly because of its unpredictability and huge luminosity.



Binary black hole model proposed for this source. Credit: Dey et al. 2018

Studies done in the past on OJ 287 preferred the binary black hole model for this source. But a flare was observed in April-May 2020, which was not predicted under the binary black hole scenario suggesting that there are other physical phenomena involved in this source that are causing the bright X-ray and optical flares which needed to be explored.

A group of scientists from Raman Research Institute, an autonomous institute of the Department of Science & Technology, Govt. of India, along with Rukayia Khatoon from Tezpur University, Prof. Bożena Czerny from Center for Theoretical Physics, Poland and Dr. Pratik Majumdar from Saha Institute of Nuclear Institute studying the blazar OJ 287, who studied the 2nd brightest flare observed in X-ray in April-May 2020 observed very interesting behaviour of the X-ray spectrum during its flaring and non-flaring states. The team consisting of Raj Prince, Gayathri Raman, and Varun, past Ph.D. students of Raman Research Institute, Aditi Agarwal, currently a Postdoctoral fellow at Raman Research Institute, and Nayantara Gupta, a faculty member at Raman Research Institute, also detected a significant spectral change in X-ray and optical-UV suggesting a complex nature of the source of blazar OJ 287.

They included the observational data recorded by Astrosat, the first dedicated Indian astronomy mission aimed at studying celestial sources in X-ray, optical, and UV spectral bands simultaneously, along with publicly available data from other detectors from all over the world like

the Swift-XRT/UVOT, NuSTAR to explore the temporal as well as spectral behavior of this source.

They found a significant change in the optical-UV and X-ray spectrum, which leads to a shift in the location of the peak of radiation from highly energetic electrons in the magnetic field or the peak of synchrotron emission towards higher energy. As a result, the blazar OJ 287, which is known to be a BL Lac type object with peak energy flux at low energy, showed a peak at higher energy.

The temporal and the spectral properties of blazar OJ 287 study published in “Monthly Notices of the Royal Astronomical Society (MNRAS)” suggested a significant change in the spectral property as the source travels from a low flux state to a high flux state. The modeling of the observational data suggests an increase in the jet magnetic field (magnetic field in the jet-like emission region) during the flaring state.

Binary black hole systems in blazars are very rare, and their study can establish the theory of galaxy mergers in the early universe, which eventually results in a binary black hole system. Thus, this study, partially supported by the Polish Funding Agency, National Science Centre, can provide a better understanding of blazar OJ 287.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1761404>



पत्र सूचना कार्यालय
भारत सरकार

विज्ञान एवं प्रौद्योगिकी मंत्रालय

Wed, 06 Oct 2021 3:26PM

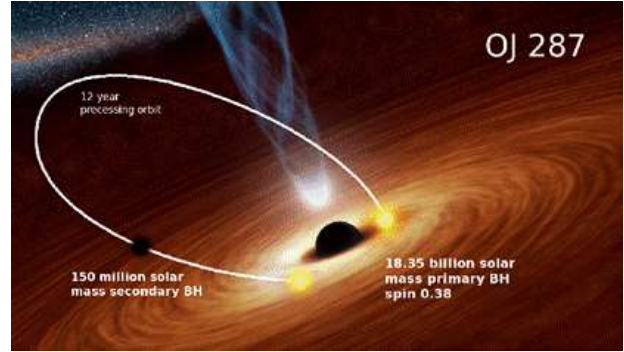
पृथ्वी से 3.5 अरब प्रकाश-वर्ष दूर ब्लेज़र भौतिकी विज्ञान की बेहतर समझ प्रदान करता है और विशाल ऑप्टिकल चमक को सशक्त बनाता है

वैज्ञानिक पृथ्वी से 3.5 बिलियन प्रकाश-वर्ष की दूरी पर स्थित एक ब्लेज़र पर नजर रखे हुए हैं जो सूर्य की चमक से 1 खरब गुणा से अधिक समय तक अपने अर्ध-आवधिक ऑप्टिकल विस्फोटों के साथ विद्यमान है। लगभग 120 वर्ष पहले इसकी प्रवाह स्थिति में अचानक जो बढ़ोतरी हुई थी उसका पता लगा लिया है। ऑप्टिकल चमक के स्रोत के साथ जिन्हें पहले बाइनरी सुपरमैसिव ब्लैक होल समझा जाता था उनके बारे में यह अध्ययन से पता चला है कि यह स्रोत कहीं अधिक जटिल है। इस अध्ययन ब्लेज़रों और ऑप्टिकल चमक के स्रोत को शक्ति प्रदान करने वाले भौतिक विज्ञान की बेहतर समझ उपलब्ध कराएगा।

ब्लेज़र्स ब्रहमांड के सबसे चमकीले स्रोतों में से एक है और इन वस्तुओं की विशेष श्रेणी को बीएल लाक्स कहा जाता है, जो उत्सर्जन में तेजी और बड़ी परिवर्तनशीलता दिखाते हैं। ओजे287 नामक एक ब्लेज़र, केंद्रीय सुपरमैसिव ब्लैक होल है सबसे बड़ा ज्ञात ब्लैक होल है, जो इसी वर्ग से संबंधित है। हालांकि, इसकी ऑप्टिकल चमक विशिष्ट और बीएल लाक्स से अलग है। इसे एक बाइनरी ब्लैक होल सिस्टम के रूप में प्रस्तावित किया गया था, जहां केन्द्रीय ब्लैक के चारों ओर एक सुपरमैसिव ब्लैक होल लगभग 12 वर्षों (एक सदी-लंबी ऑप्टिकल निगरानी के परिणामस्वरूप) की कक्षीय अवधि के साथ केंद्रीय ब्लैक होल के चारों ओर परिक्रमा कर रहा है। इस ऑप्टिकल चमक का अंतर्निहित भौतिक तंत्र मुख्य रूप से इसकी अप्रत्याशितता और विशाल चमक के कारण लंबे समय से एक पहली बना हुआ है।

ओजे287 के बारे में विगत में किए गए अध्ययनों द्वारा इस स्रोत के लिए एक बाइनरी ब्लैक होल मॉडल को प्राथमिकता दी गई है लेकिन अप्रैल-मई, 2020 में एक चमक देखी गई, जिसकी भविष्यवाणी बाइनरी ब्लैक होल परिदृश्य के तहत नहीं की गई थी, जो यह सुझाव देती है कि इस स्रोत में अन्य भौतिक घटनाएं शामिल हैं जो चमकीली एक्स-रे और ऑप्टिकल चमक का कारण बन रही हैं जिनका पता लगाए जाने की जरूरत है।

भारत सरकार के विज्ञान और प्रौद्योगिकी विभाग के तहत एक स्वायत्त संस्थान, रमन अनुसंधान संस्थान के वैज्ञानिकों के एक समूह ने तेजपुर विश्वविद्यालय की रुकैया खातून, पोलैंड के सैद्धांतिक भौतिकी केंद्र के प्रो. बोजेना ज़ेर्नी और साहा इंस्टीट्यूट ऑफ न्यूक्लियर इंस्टीट्यूट के डॉ. प्रतीक मजूमदार ब्लेज़र ओजे287 का अध्ययन कर रहे हैं, जिन्होंने एक्स-रे में देखी गई दूसरी सबसे



Binary black hole model proposed for this source. Credit: Dey et al. 2018

चमकीली चमक का अध्ययन किया। अप्रैल-मई, 2020 में इसकी चमकीली और गैर-चमकीली स्थितियों के दौरान उन्होंने एक्स-रे स्पेक्ट्रम के व्यवहार में बहुत दिलचस्प बात का पता चला है। इस टीम में राज प्रिंस, गायत्री रमन और वरुण शामिल थे जो रमन रिसर्च इंस्टीट्यूट के पीएच.डी. पास छात्र थे। इनके साथ रमन अनुसंधान संस्थान में पोस्टडॉक्टरल फेलो कर रही अदिति अग्रवाल और इसी संस्थान की फैकल्टी सदस्य नयनतारा गुप्ता शामिल थी। जिन्होंने यह पता लगाया कि एक्स-रे और ऑप्टिकल-यूवी में महत्वपूर्ण स्पेक्ट्रम परिवर्तन हुआ है जो यह सुझाव देता है कि ब्लेज़र ओजे287 का जटिल स्वरूप है।

इनमें एस्ट्रोसैट द्वारा रिकॉर्ड किए गए पर्यवेक्षणीय संबंधी डेटा शामिल थे, पहले समर्पित भारतीय खगोल विज्ञान मिशन का उद्देश्य एक्स-रे, ऑप्टिकल और यूवी स्पेक्ट्रल बैंड में खगोलीय स्रोतों का एक साथ अध्ययन करना था, साथ ही दुनिया भर के स्विफ्ट- एक्सआरटी/यूवीओटी, नूस्टार जैसे अन्य डिटेक्टरों से सार्वजनिक रूप से प्राप्त किए गए उपलब्ध आंकड़ों का उपयोग इस स्रोत के टेम्पोरल के साथ-साथ स्पेक्ट्रम व्यवहार का पता लगाने के लिए किया गया था।

उन्होंने यह पता लगाया कि ऑप्टिकल-यूवी और एक्स-रे स्पेक्ट्रम में एक महत्वपूर्ण परिवर्तन हुआ है, जो चुंबकीय क्षेत्र में बहुत अधिक ऊर्जावान इलेक्ट्रॉनों से रेडिएशन के शिखर स्थल में परिवर्तन या उच्च ऊर्जा की ओर से सिंक्रोट्रॉन उत्सर्जन के शिखर की ओर ले जाता है। जिसके परिणामस्वरूप ब्लेज़र ओजे287, जिसे कम ऊर्जा पर चरम ऊर्जा प्रवाह के साथ बीएल लाक्स तरह की वस्तु के रूप में जाना जाता है, जिसने उच्च ऊर्जा पर एक शिखर को दिखलाया है।

"मंथली नोटिस ऑफ द रॉयल एस्ट्रोनॉमिकल सोसाइटी (एमएनआरएस)" में प्रकाशित ब्लेज़र ओजे287 के टेम्पोरल और स्पेक्ट्रम गुण यह दर्शाते हैं कि स्पेक्ट्रम गुणधर्म में महत्वपूर्ण परिवर्तन हुआ है क्योंकि स्रोत कम फलक्स से उच्च फलक्स अवस्था तक यात्रा करता है। पर्यवेक्षणीय डेटा की मॉडलिंग यह सुझाव देती है कि चमक की स्थिति के दौरान जेट चुंबकीय क्षेत्र (जेट जैसे उत्सर्जन क्षेत्र में चुंबकीय क्षेत्र) में वृद्धि हुई है।

ब्लेज़र में बाइनरी ब्लैक होल सिस्टम और उनका अध्ययन ब्रहमांड के शुरू में आकाशगंगा में विलय के सिद्धांत को स्थापित कर सकता है, जिसके परिणामस्वरूप एक बाइनरी ब्लैक होल सिस्टम पैदा हुआ है। इस प्रकार आंशिक रूप से पोलिश फंडिंग एर्जेसी, नेशनल साइंस सेंटर द्वारा समर्थित यह अध्ययन ब्लेज़र ओजे287 की बेहतर समझ प्रदान कर सकता है।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1761520>

Skyrmion research: Braids of nanovortices discovered

By *Forschungszentrum Juelich*

A team of scientists from Germany, Sweden and China has discovered a new physical phenomenon: complex braided structures made of tiny magnetic vortices known as skyrmions. Skyrmions were first detected experimentally a little over a decade ago and have since been the subject of numerous studies, as well as providing a possible basis for innovative concepts in information processing that offer better performance and lower energy consumption. Furthermore, skyrmions influence the magnetoresistive and thermodynamic properties of a material. The discovery therefore has relevance for both applied and basic research.

Strings, threads and braided structures can be seen everywhere in daily life, from shoelaces, to woolen pullovers, from plaits in a child's hair to the braided steel cables that are used to support countless bridges. These structures are also commonly seen in nature and can, for example, give plant fibers tensile or flexural strength. Physicists at Forschungszentrum Jülich, together with colleagues from Stockholm and Hefei, have discovered that such structures exist on the nanoscale in alloys of iron and the metalloid germanium.

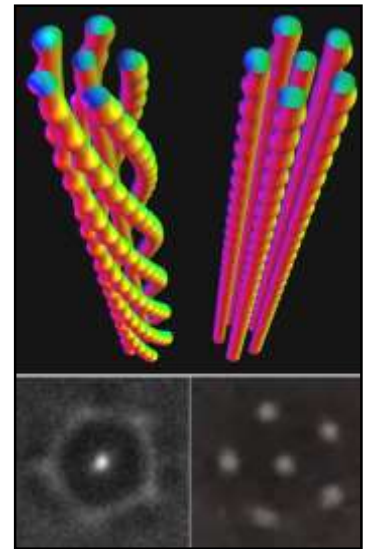
These nanostrings are each made up of several skyrmions that are twisted together to a greater or lesser extent, rather like the strands of a rope. Each skyrmion itself consists of magnetic moments that point in different directions and together take the form of an elongated tiny vortex. An individual skyrmion strand has a diameter of less than one micrometer. The length of the magnetic structures is limited only by the thickness of the sample; they extend from one surface of the sample to the opposite surface.

Earlier studies by other scientists had shown that such filaments are largely linear and almost rod-shaped. However, ultra-high-resolution microscopy investigations undertaken at the Ernst Ruska-Centre in Jülich the theoretical studies at Jülich's Peter Grünberg Institute have revealed a more varied picture: the threads can in fact twist together to varying degrees. According to the researchers, these complex shapes stabilize the magnetic structures, making them particularly interesting for use in a range of applications.

"Mathematics contains a great variety of these structures. Now we know that this theoretical knowledge can be translated into real physical phenomena," Jülich physicist Dr. Nikolai Kiselev is pleased to report. "These types of structures inside magnetic solids suggest unique electrical and magnetic properties. However, further research is needed to verify this."

To explain the discrepancy between these studies and previous ones, the researcher points out that analyses using an ultra-high-resolution electron microscope do not simply provide an image of the sample, as in the case of, for example, an optical microscope. This is because quantum mechanical phenomena come into play when the high energy electrons interact with those in the sample.

"It is quite feasible that other researchers have also seen these structures under the microscope, but have been unable to interpret them. This is because it is not possible to directly determine the distribution of magnetization directions in the sample from the data obtained. Instead, it is



Researchers at Jülich have detected string-like structures made of skyrmions. Above, simulated models of six skyrmions at different magnetic field strengths; below, transmission electron microscope images of such structures observed in a thin film. Credit: Forschungszentrum Jülich

necessary to create a theoretical model of the sample and to generate a kind of electron microscope image from it," explains Kiselev. "If the theoretical and experimental images match, one can conclude that the model is able to represent reality." In ultra-high-resolution analyses of this kind, Forschungszentrum Jülich with its Ernst Ruska-Centre counts as one of the leading institutions worldwide.

More information: Nikolai Kiselev et al, Magnetic skyrmion braids, *Nature Communications* (2021). DOI: [10.1038/s41467-021-25389-7](https://doi.org/10.1038/s41467-021-25389-7)

Journal information: [Nature Communications](https://phys.org/news/2021-10-skyrmion-braids-nanovortices.html)
<https://phys.org/news/2021-10-skyrmion-braids-nanovortices.html>



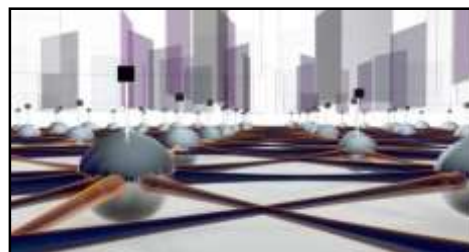
Thu, 07 Oct 2021

New mathematical tools to study opinion dynamics

By Erica K. Brockmeier

Research published in the *SIAM Journal on Applied Mathematics* describes a new mathematical model for studying influence across social networks. Using tools from the field of topology, Robert Ghrist and Ph.D. graduate Jakob Hansen developed a framework to track how opinions change over time in a wide range of scenarios, including ones where individuals can use deceptive behaviors and propaganda agents can drive a group's consensus.

With the rise of social media platforms, there has been increased interest in developing different types of models to study behavior over networks; in mathematics, that means studying networks, groups of individuals, known as nodes, and their connections to one another, known as edges. The current challenge, says Ghrist, is developing mathematical frameworks that can incorporate a broader range of features to help model more real-world types of scenarios.



An artistic rendering of a discourse sheaf, with vector spaces (depicted as rectangles) connected to a network (shown as a series of circles, or nodes, and connecting lines, or edges). Credit: Robert Ghrist

"There are a lot of people putting out models that have one or two novel features; one allows for multiple opinions, another allows people to selectively lie to their neighbors, and another has the introduction of a propagandist," he says. "What we were looking to do was come up with a framework that can incorporate all of these different aspects, yet still be able to prove rigorous theorems about how the model behaves."

To do this, Ghrist and Hansen used topological tools called sheaves, previously used in their group. Sheaves are algebraic data structures, or collections of vector spaces, that are tethered to a network and link information to individual nodes or edges. Using a transportation network as an illustrative example, where train stations are nodes and the tracks are the edges, sheaves are used to carry information about the network, such as passenger counts or the number of on-time departures, not only for specific stations but also on the connections between stations.

"These vector spaces can have different features and dimensions, and they can encode different quantities and types of information," says Ghrist. "So the sheave consists of collections of vectors over top of each node and each edge with matrices that connect them all together. Collectively, this is a big data structure floating over top of your network."

One of the core mathematical concepts that enabled this work was the incorporation of Laplacian operators and diffusion dynamics into the model. Laplacians were used in a classic study of opinion dynamics, which found that, for individuals with a scaled opinion on a specific topic,

such as their opinion of the president from 1 to 10, interacting with their neighbors in the network would move their opinion towards a local average.

"If that were an accurate model, what that would mean is that the more we talk to each other over social media the more we all come to believe the same thing," Ghrist says. "That didn't work out so well and leads us to the problem of explaining cleavage or polarization. So what we do in our paper is build this new framework that can accommodate all kinds of interesting twists on the classical situation."

By incorporating Laplacians into their "discourse sheaves," the researchers were able to create an opinion dynamics model that was incredibly flexible and able to incorporate a wide variety of scenarios, parameters, and features. This includes the ability to have agents who can lie about their feelings on a specific topic or tell different opinions to others depending on how they are connected, all within a rigorous and testable mathematical framework.

"The key mathematical innovation here is a Laplacian for sheaves that allows the system to evolve in such a way that you can prove results about public consensus. What we see when we run certain examples is that you can have systems where people start off being neighbors and very much in disagreement, and the system naturally evolves towards a public agreement while people can maintain their private opinions," says Ghrist.

Another interesting finding, Ghrist says, is how, using "co-homology," one can characterize when this model is both observable and controllable, meaning that one can get a social network to evolve to a particular opinion by designating specific agents as inputs, ones that broadcast propaganda, and others as outputs, ones that are observed to track opinion change. "There are conditions under which you can designate a set of target individuals and control their opinions by seeding the network with propaganda and letting the system evolve," says Ghrist, adding that, while the findings are concerning, there is a gap between using these models to study networks versus controlling how ideas spread in the real world.

The next step for Ghrist and his group is to find ways to work with more complex sheaves, such as ones with logical statements instead of numerical values. "The mathematical challenges associated with this are substantial, and my group and I have been working very hard on trying to lift all the mathematics to incorporate these more complex data types," he says.

Ghrist also hopes that researchers from a variety of other fields, from economics to neuroscience, will find these tools useful because of their adaptivity and flexibility. "Sheaf theory was developed in the 1950s, and yet it's one of these things that never crossed over into applied math in part because it's very abstract," he says. "I have been working for about 15 years on adapting ideas from sheaves and sheaf theory into a context that people can use outside of math, and I'm hopeful that this paper really pushes things in that direction."

More information: Jakob Hansen et al, Opinion Dynamics on Discourse Sheaves, *SIAM Journal on Applied Mathematics* (2021). [DOI: 10.1137/20M1341088](https://doi.org/10.1137/20M1341088)

Journal information: [SIAM Journal on Applied Mathematics](https://phys.org/news/2021-10-mathematical-tools-opinion-dynamics.html)
<https://phys.org/news/2021-10-mathematical-tools-opinion-dynamics.html>

Researchers reach quantum networking milestone in real-world environment

By Elizabeth Rosenthal

A team from the U.S. Department of Energy's Oak Ridge National Laboratory, Stanford University and Purdue University developed and demonstrated a novel, fully functional quantum local area network, or QLAN, to enable real-time adjustments to information shared with geographically isolated systems at ORNL using entangled photons passing through optical fiber.

This network exemplifies how experts might routinely connect quantum computers and sensors at a practical scale, thereby realizing the full potential of these next-generation technologies on the path toward the highly anticipated quantum internet. The team's results, which are published in *PRX Quantum*, mark the culmination of years of related research.

Local area networks that connect classical computing devices are nothing new, and QLANs have been successfully tested in tabletop studies. Quantum key distribution has been the most common example of quantum communications in the field thus far, but this procedure is limited because it only establishes security, not entanglement, between sites.

"We're trying to lay a foundation upon which we can build a quantum internet by understanding critical functions, such as entanglement distribution bandwidth," said Nicholas Peters, the Quantum Information Science section head at ORNL. "Our goal is to develop the fundamental tools and building blocks we need to demonstrate quantum networking applications so that they can be deployed in real networks to realize quantum advantages."

When two photons—particles of light—are paired together, or entangled, they exhibit quantum correlations that are stronger than those possible with any classical method, regardless of the physical distance between them. These interactions enable counterintuitive quantum communications protocols that can only be achieved using quantum resources.

One such protocol, remote state preparation, harnesses entanglement and classical communications to encode information by measuring one half of an entangled [photon pair](#) and effectively converting the other half to the preferred quantum state. Peters led the first general experimental realization of remote state preparation in 2005 while earning his doctorate in physics. The team applied this technique across all the paired links in the QLAN—a feat not previously accomplished on a network—and demonstrated the scalability of entanglement-based quantum communications.

This approach allowed the team to link together three remote nodes, known as "Alice," "Bob" and "Charlie"—names commonly used for fictional characters who can communicate through quantum transmissions—located in three different research laboratories in three separate buildings on ORNL's campus. From the laboratory containing Alice and the photon source, the photons distributed entanglement to Bob and Charlie through ORNL's existing fiber-optic infrastructure.

Quantum networks are incompatible with amplifiers and other classical signal boosting resources, which interfere with the quantum correlations shared by entangled photons. With this potential drawback in mind, the team incorporated flexible grid bandwidth provisioning, which uses wavelength-selective switches to allocate and reallocate quantum resources to network users



Quantum equipment in the Alice laboratory, where the photon source and the first node in the team's network are stored. Credit: Carlos Jones/ORNL, U.S. Dept. of Energy

without disconnecting the QLAN. This technique provides a type of built-in fault tolerance through which network operators can respond to an unanticipated event, such as a broken fiber, by rerouting traffic to other areas without disrupting the network's speed or compromising security protocols.

"Because the demand in a network might change over time or with different configurations, you don't want to have a system with fixed wavelength channels that always assigns particular users the same portions," said Joseph Lukens, a Wigner Fellow and research scientist at ORNL as well as the team's electrical engineering expert. "Instead, you want the flexibility to provide more or less bandwidth to users on the network according to their needs."

Compared with their typical classical counterparts, quantum networks need the timing of each node's activity to be much more closely synchronized. To meet this requirement, the researchers relied on GPS, the same versatile and cost-effective technology that uses satellite data to provide everyday navigation services. Using a GPS antenna located in Bob's laboratory, the team shared the signal with each node to ensure that the GPS-based clocks were synchronized within a few nanoseconds and that they would not drift apart during the experiment.

Having obtained precise timestamps for the arrival of entangled photons captured by photon detectors, the team sent these measurements from the QLAN to a classical network, where they compiled high-quality data from all three laboratories.

"This part of the project became a challenging classical networking experiment with very tight tolerances," Lukens said. "Timing on a classical network rarely requires that level of precision or that much attention to detail regarding the coding and synchronization between the different laboratories."

Without the GPS signal, the QLAN demonstration would have generated lower quality data and lowered fidelity, a mathematical metric tied to quantum network performance that measures the distance between quantum states.

The team anticipates that small upgrades to the QLAN, including adding more nodes and nesting wavelength-selective switches together, would form quantum versions of interconnected networks—the literal definition of the internet.

"The internet is a large network made up of many smaller networks," said Muneer Alshowkan, a postdoctoral research associate at ORNL who brought valuable computer science expertise to the project. "The next big step toward the development of a quantum internet is to connect the QLAN to other quantum networks."

Additionally, the team's findings could be applied to improve other detection techniques, such as those used to seek evidence of elusive dark matter, the invisible substance thought to be the universe's predominant source of matter.

"Imagine building networks of quantum sensors with the ability to see fundamental high-energy physics effects," Peters said. "By developing this technology, we aim to lower the sensitivity needed to measure those phenomena to assist in the ongoing search for dark matter and other efforts to better understand the universe."

The researchers are already planning their next experiment, which will focus on implementing even more advanced timing synchronization methods to reduce the number of accidentals—the sources of noise in the network—and further improve the QLAN's quality of service.

More information: Muneer Alshowkan et al, Reconfigurable Quantum Local Area Network Over Deployed Fiber. *PRX Quantum* (2021). DOI: [10.1103/PRXQuantum.2.040304](https://doi.org/10.1103/PRXQuantum.2.040304)
<https://phys.org/news/2021-10-quantum-networking-milestone-real-world-environment.html>

‘Covid toe’ may be side-effect of immune response, says study

Chilblain-like inflammation causes redness on hands and feet and can last for months

The skin condition known as Covid toe may be a side-effect of the immune system’s response to fighting off the virus, according to a study.

The symptom results in chilblain-like inflammation and redness on the hands and feet, with the condition sometimes lasting for months at a time. It typically develops within a week to four weeks of being infected and can result in toes and fingers becoming swollen or changing colour.

Researchers behind the study, which has been published in the British Journal of Dermatology, examined 50 participants with the condition and 13 with similar chilblains lesions that arose before the pandemic.

They found one mechanism behind both types of the condition involved the body generating an immune response with high levels of certain autoantibodies, which mistakenly target and react with a person’s own cells and tissues as well as the invading virus. They also found an overlap with type I interferon, a key protein in the antiviral response.

In addition to the immune system, cells lining blood vessels that supply the affected areas also appeared to play a critical role in the development of Covid toes and chilblains.

The senior author of the study, Dr Charles Cassius, said the research provided a deeper understanding of the condition. “The epidemiology and clinical features of chilblain-like lesions have been extensively studied and published. However, little is known about the pathophysiology involved. Our study provides new insights.”

Concerns were raised in the opening months of the pandemic that so-called Covid toe was one of the non-recognised symptoms of infection, after patients in several countries reported the condition even though, in some cases, they displayed none of the usual symptoms.

Red or purple lesions on the side or sole of the foot or on hands and fingers were described. In May 2020, the European Journal of Pediatric Dermatology reported an “epidemic” of cases among children and adolescents in Italy. It said that, unlike other rashes associated with coronavirus, it had not been previously observed.

“We observed an ‘epidemic’ of acute and self-healing vasculitic lesions of the hands and feet in asymptomatic children and adolescents. These lesions constituted a novelty that led us to establish a link with the other much more severe novelty, ie Covid-19, which also occurred almost simultaneously,” they wrote.

The UK podiatrist Dr Ivan Bristow agreed that, for most people, the condition cleared up itself – similar to chilblains. However, he said some people might need treatment with creams and other drugs. “The confirmation of the cause will help to develop new treatments to manage it more effectively.”



The condition typically develops within a week to four weeks of being infected and can result in toes and fingers becoming swollen or changing colour. Photograph: Chris Curry/Getty Images/iStockphoto

Dr Veronique Bataille, a consultant dermatologist and spokesperson for the British Skin Foundation, said Covid toe was seen very frequently during the early phase of the pandemic, but had been less common in the current Delta variant wave.

She said that might be down to more people being vaccinated or having some protection against Covid from past infections. “Presentations after vaccination are much rarer.”

<https://www.theguardian.com/world/2021/oct/06/covid-toe-may-be-side-effect-immune-response-study>

