

Dec
2021

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खंड : 46 अंक : 261 31 दिसंबर 2021
Vol.: 46 Issue : 261 31 December 2021



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‘Done deal’: Philippines allocates funds to buy India’s BrahMos missile system

The Philippines government recently allocated 2.8 billion pesos (\$55.5 million) for initial funding for the BrahMos cruise missile

By Rezaul H Laskar

New Delhi: The Philippines is set to become the first foreign customer for the BrahMos cruise missile system jointly developed by India and Russia, with the government in Manila recently allocating 2.8 billion pesos (\$55.5 million) for initial funding for the weapon system.

The process for the acquisition of the medium-range supersonic cruise missile by the Philippines armed forces suffered a setback because of the Covid-19 pandemic but is now back on track, people familiar with the matter said on condition of anonymity.

According to the website of the Philippines’ department of budget management, two “special allotment release orders” worth 1.3 billion pesos and 1.535 billion pesos were issued on December 27 to cover the initial funding requirements for the “Shore-Based Anti-Ship Missile System Acquisition Project” of the Philippine Navy.

The people cited above confirmed this allocation was for the BrahMos missile system. They added that a team from the Philippine Navy visited the production unit of BrahMos Aerospace in Hyderabad earlier this month as part of the acquisition process.

The BrahMos Integration Complex in Hyderabad is responsible for integration of mechanical systems and assembling electronic systems. Various sub-systems fabricated in other centres in India and Russia are integrated and checked at this complex.

“It is a done deal and there will be further developments early next year,” one of the people cited above said.

The Philippines armed forces are implementing a revised modernisation programme and a contract for two corvettes was signed by the navy with South Korea’s Hyundai Heavy Industries on December 28. The Philippines also plans to sign contracts for 36 Black Hawk helicopters and six offshore patrol vessels in 2022.

The department of budget management also made substantial allocation this month to cover the initial funding requirements for the acquisition of utility helicopters by the Philippine Air Force and fast boats for the navy.

On March 2, India and the Philippines signed an “implementing arrangement” to facilitate government-to-government deals on military hardware and equipment, including the BrahMos missile, which has a range of 290 km and can carry a 200-kg warhead.



A team from the Philippine Navy visited the production unit of BrahMos Aerospace in Hyderabad earlier this month as part of the process to acquire the BrahMos cruise missile system jointly developed by India and Russia. (HT File Photo)

Filipino defence secretary Delfin Lorenzana, who witnessed the signing ceremony, was quoted by the media as saying at the time that Philippines is buying the BrahMos missile. Lorenzana said the agreement would serve as a guide for the two sides on policies and procedures in defence procurement.

Hindustan Times had first reported in December 2019 that the Philippines was set to become the first country to buy the BrahMos missile system. Both sides were keen on signing a deal during a proposed visit by President Rodrigo Duterte early in 2021, but the plan fell through because of the widespread disruptions caused by the pandemic.

The Philippine Army's first Land Based Missile System Battery also has plans to acquire the BrahMos. Russian officials have said India and Russia are working to gradually increase the range of the BrahMos and begin exporting the missile to third countries.

The Philippines zeroed in on the BrahMos after extensive trials and much of the negotiations have revolved around the cost of the system. India had offered a \$100-million line of credit to the Philippines for defence purchases.

India has been in talks with several Southeast Asian countries, including Thailand, Indonesia and Vietnam, in recent years to sell them land and sea-based versions of the BrahMos. New Delhi has set an ambitious target of achieving defence exports worth \$5 billion by 2025.

<https://www.hindustantimes.com/india-news/done-deal-philippines-allocates-funds-to-buy-india-s-brahmos-missile-system-101640869478707.html>

THE TIMES OF INDIA

Fri, 31 Dec 2021

India, Philippines set to conclude BrahMos missile deal

New Delhi: India and the Philippines are set to formally seal a government-to-government BrahMos deal soon, capping years of negotiations for the supply of a batch of the supersonic cruise missiles for the Philippine navy, people familiar with the development said on Thursday. The procurement is expected to signal a major upswing in India's strategic ties with the Philippines which has been focusing on ramping up its naval prowess in the face of its lingering friction with China in the South China Sea.

The people cited above said the negotiations on the BrahMos deal have almost been completed and that both sides are now set to formally seal the contract in the next few weeks.

BrahMos Aerospace, an India-Russian joint venture, produces supersonic cruise missiles that can be launched from submarines, ships, aircraft, or land platforms.

The missile flies at a speed of 2.8 Mach or almost three times the speed of sound. The variant to be exported is likely to have a range of around 290 kilometres.

In the last few days, the Philippines have sealed a number of defence deals to modernise its armed forces.

In November last year, Russian Deputy Chief of Mission Roman Babushkin said that India and Russia are planning to export the BrahMos missile to the Philippines and several other countries.

It is learnt that initially, the Philippines will procure the missiles for its naval forces though the country is also looking at the weapons for its land forces as well.

A number of countries including Indonesia and many in the Gulf region have shown interest in procuring the missile.

In March, India signed a framework agreement with the Philippines that provided for government-to-government deals for the supply of defence material and equipment.



The defence and strategic ties between India and the Philippines are on an upward trajectory in the last few years.

In August, India carried out a naval exercise with the Philippines in the South China Sea.

An important country of the ASEAN (Association of Southeast Asian Nations), the Philippines has territorial disputes with China in the South China Sea region.

China claims sovereignty over all of the South China Sea, a huge source of hydrocarbons. However, several ASEAN member countries, including Vietnam, the Philippines and Brunei, have counterclaims.

<https://timesofindia.indiatimes.com/india/india-philippines-set-to-conclude-brahmos-missile-deal/articleshow/88595747.cms>

INQUIRER.NET

Fri, 31 Dec 2021

PH military closer to acquiring cruise missiles from India

By Jeannette I. Andrade

Manila (Philippines): After more than a year's delay, the Department of National Defense (DND) can finally proceed with its acquisition of cruise missiles from India, following the approval of funds worth P2.83 billion for release by the Department of Budget and Management (DBM).

The DBM on Dec. 27 issued two special allotment release orders (Saros) — one for P1.3 billion and the other for P1.53 billion, to cover initial funding requirements for the Philippine Navy's shore-based antiship missile system acquisition project.

Defense Secretary Delfin Lorenzana earlier said the Navy was intent on acquiring the medium-range ramjet supersonic BrahMos cruise missile system from India, which he described as “one of the most sophisticated in the world.”

Diverted to COVID

In November last year, Lorenzana disclosed that talks concerning the procurement had been stalled by the coronavirus pandemic. A deal was supposed to have been sealed in the first half of 2020 but, according to the DND chief, funds meant for the missiles were instead used for the government's pandemic response.

The BrahMos (short for the Brahmaputra and the Moskva rivers) system features medium-range missiles that can be launched from submarines, ships, aircraft or land-based platforms.

The Navy is eyeing a land-based BrahMos missile system mainly for coastal defense, under the second phase (2018 to 2022) of the Revised Armed Forces of the Philippines Modernization Program (RAFPMP). The plan was to procure two missile batteries, each with three mobile autonomous launchers.

Lorenzana said the cruise missiles would only be for defensive measures and “will not be used as offensive weapons.

Upgrades since 2016

Since 2016, under the Duterte administration, the AFP has acquired some P135 billion worth of big-ticket items under the program, for which it had set aside P25 billion each year. But funds worth P17 billion for procurements programmed in 2019 and 2020, however, were diverted to the pandemic response.



FOR PH SHORES The Philippine Navy hopes to beef up the country's coastal defense with BrahMos cruise missiles, shown here mounted on a truck and paraded in New Delhi, India, in January 2015. —REUTERS

In 2021, P27 billion was allocated for the program, which was jump-started after a two-year lull.

Acquisitions under the program since 2016 include the two missile-capable frigates (BRP Jose Rizal and BRP Antonio Luna); six Embraer A-29B “Super Tucano” attack aircraft; 16 S-70i Black Hawk helicopters; six T129 “Atak” helicopters; five AgustaWestland AW109 Power helicopters; two C130-H Hercules aircraft; light tanks; unmanned aerial vehicles; the Spike-ER missiles system; and an air defense and surveillance radar system.

On Tuesday, the DND signed a deal for two corvettes from South Korea.

For next year, Lorenzana is looking to seal contracts for 32 S-70i Black Hawk helicopters from Poland, six offshore patrol vessels from Australia, and the BrahMos missile system from India.

The RAFPMP follows a timetable that started in 2013 and will end in 2027. It is made up of three phases or horizons—2013-2017, 2018-2022, and 2023-2027.

<https://newsinfo.inquirer.net/1534085/ph-military-closer-to-acquiring-cruise-missiles-from-india>

Business Standard

Fri, 31 Dec 2021

Stealth game: HAL joins DRDO in building 5th-gen advanced combat aircraft

The IAF has accorded the Tejas Mark 2 its "comprehensive design review", which means its design has been found viable and the manufacture of its first prototypes cleared

By Ajai Shukla

New Delhi: The Indian Air Force (IAF) is already flying the first 32 Tejas Mark 1 fighters, and an order for 83 Tejas Mark 1A has been placed on Hindustan Aeronautics Ltd (HAL). Meanwhile, there have been important development breakthroughs in the following two fighter programmes: the Tejas Mark 2 and the 5th-generation Advanced Medium Combat Aircraft (AMCA).

The Indian Air Force (IAF) is already flying the first 32 Tejas Mark 1 fighters, and an order for 83 Tejas Mark 1A has been placed on Hindustan Aeronautics Ltd (HAL). Meanwhile, there have been important development breakthroughs in the following two fighter programmes: the Tejas Mark 2 and the 5th-generation Advanced Medium Combat Aircraft (AMCA).



An artist's rendition of the Advanced Medium Combat Aircraft (AMCA) -- the 5th-Gen fighter being developed by HAL and ADA

The IAF has accorded the Tejas Mark 2 its “comprehensive design review” (CDR), which means its design has been found viable and the manufacture of its first prototypes cleared.

The AMCA is one step behind, with its preliminary design review (PDR) done last December. It was anticipated that its CDR would also be completed this December, but it now more realistically targeted for end-2022.

Girish Deodhare, who heads the Aeronautical Development Agency (ADA) – the Defence R&D Organisation (DRDO) agency that oversees the Tejas and AMCA programmes – told *Business Standard* that the AMCA’s stealth shaping had been completed, its design is now mature and its internal systems are laid out. The accord of the CDR next year would clear the way for metal cutting – the symbolic start of constructing a flying prototype.

In an exclusive visit by *Business Standard* to HAL, designers stated: “The AMCA’s first flight is targeted for 2024-25. We plan to build five prototypes for a flight-testing programme that would take about four years. By 2028-29, we plan to begin series manufacture.”

Stealth fighters – such as the AMCA – play a crucial role in a war’s opening stages. Taking advantage of their invisibility to radar, they fly deep into enemy airspace and strike enemy radars, air bases and control centres in order to obtain air superiority. This opens the door for “non-stealthy” fighters like the Sukhoi-30MKI, Jaguar and Mirage 2000 to penetrate enemy airspace and strike enemy targets such as roads, railways, airfields, depots and ground forces without incurring heavy casualties.

For example, in a war with China, India’s opening salvos would consist of AMCA strikes deep into China, to destroy its rail and road links with Tibet and isolate the People’s Liberation Army (PLA) divisions on the Sino-India border.

A 5th-generation fighter like the AMCA is able to defang enemy air defences because of four advanced capabilities: It is “stealthy”, or near-invisible to enemy radar, and it can “supercruise”, or fly faster than the speed of sound without engaging its engines’ fuel-guzzling afterburners. Third, its advanced avionics and sensors, coupled with artificial intelligence and network-centric operations enhance the pilot-aircraft interface, allowing a single pilot to both fly and fight the aircraft. Fourth, it can detect and engage targets from long distances, outranging its adversaries.

Stealth remains a 5th-generation fighter’s key attribute. It is shaped to scatter radar waves, rather than being detected by reflected waves. Special non-reflective materials and coatings further reduce radar reflectivity. In stealth mode, a 5th-generation fighter conceals its fuel and weapons in an internal bay, since carrying them under its wings, as conventional fighters do, creating protrusions that reflect radar wave and compromise stealth.

According to HAL chairman, R Madhavan, the AMCA will have an “all-up-weight” (AUP) of 20 tonnes in stealth mode, when it would carry just one-and-a-half tonnes of weaponry concealed in internal weapon bays. However, in “non-stealth mode”, another five tonnes of fuel of armaments could be carried on external stations, under its wings.

When functioning as a deep penetration bomber, the AMCA would carry up to 6.5 tonnes of fuel in internal tanks. Its operating range is secret, but a rough calculation would indicate an ability to strike targets 1,000 kilometres inside enemy airspace and return to base.

Stealth is easily compromised, such as while releasing weapons onto a target. This requires weapons bay doors to open, release weapons and close again within 1.5 seconds. During this period, the fighter is more easily detected by enemy radar.

In “non-stealth” mode, the AMCA would carry much of its weapons load on its six external, under-wing stations. That would free up internal fuel tanks to carry an additional 1,200-1,300 litres of fuel, increasing its capability as a potent long-range, non-stealthy bomber.

However, given the AMCA’s tactical value and its cost, it is likely to be reserved mainly for stealth missions, using armament carried on four weapons stations in its internal bays.

Alongside the engineering of a stealthy profile, the AMCA programme’s biggest challenge is to develop a new, “super-cruising” engine. Until a suitable indigenous engine is developed, the AMCA will be powered by twin General Electric (GE) F-414 engines – which, in single-engine configuration, will power the Tejas Mark 2.

However, even twin F-414 engines are not enough to make the AMCA super-cruise in all configurations. According to the ADA chief: “Each F-414 engine generates a maximum thrust of 98 KiloNewtons (KN), and in Indian climatic conditions that effectively degrades to 90 KN. We have calculated that an AMCA, with the configuration the IAF has specified, requires a thrust of about 220 KN (in Indian conditions) for super-cruising. That means we need twin engines, each generating 110 KN thrust in Indian conditions,” says Deodhare.

Such an engine remains elusive, even for China with all its ability to throw money and manpower at the problem. However, a group of DRDO laboratories, led by the Gas Turbine Research Establishment (GTRE), Bengaluru, is working to develop an AMCA engine. GTRE had managed to generate a maximum thrust of 83 KN with the Kaveri engine. Now the target is 50 per cent higher.

Former Defence Minister Manohar Parrikar had estimated the AMCA would cost about \$4 billion to develop – with a major share going into the engine. In 2015, India set up a “joint working group” (JWG) with America to co-develop jet engine technology. In October 19, US Under Secretary of Defence Ellen Lord renevealed the JWG had been scrapped since US export control laws safeguarded key technologies that the DRDO wanted.

With almost a decade of work and Rs 400 crore having gone into the AMCA, responsibilities are being reassigned. In 2020, HAL was given a larger share of the programme, including the responsibility for the entire structural design, less the centre fuselage.

The serial production of the AMCA was made over to HAL’s Aircraft Manufacturing Division, Nashik; which has so far been engaged in manufacturing the Sukhoi-30MKI. That order has been discharged in full.

However, the Niti Aayog has cleared a proposal to make over AMCA manufacture to a “special purpose vehicle” (SPV) that will include two private sector firms in partnership with ADA and HAL. Suitable private sector partners have not yet been identified.

https://www.business-standard.com/article/current-affairs/stealth-game-hal-joins-drdo-in-building-5th-gen-advanced-combat-aircraft-121123001476_1.html



Fri, 31 Dec 2021

The ‘K’ factor in the recent missile tests

*India’s first SLBM provides the building blocks for new missiles
allowing the DRDO self-sufficiency in missile technology*

By Sandeep Unnithan

New Delhi: India’s Defence Research and Development Organisation (DRDO) ended the year by conducting nine missile tests in December. Among others, these tests validated the performance of the air-launched variants of the Brahmos missile, extended range Pinaka rockets, a new vertically-launched short-range surface to air missile and the Agni Prime ballistic missile.

This is the second largest series of missile tests after a similar testing spurt last year. Both were a result of the Covid-19 imposed restrictions which affected the DRDO’s launch calendar, leading to a bunching up of tests corresponding to two waves of the pandemic. Two of the DRDO’s newest missiles were also tested--the Pralay tactical ballistic missile and the Supersonic Missile Assisted Rocket Torpedo (SMART). The Pralay was tested for the first time on December 22 from the Dr A.P.J. Abdul Kalam Island off the coast of Odisha. The new missile followed the desired ‘quasi-ballistic trajectory’ and reached the designated target with a high degree of accuracy, validating the control, guidance and mission algorithms. All the sensors deployed near the impact point across the eastern coast including the down range ships, tracked the missile trajectory and captured all the events, a defence ministry press release said. The missile was developed in just four years. DRDO officials say the Pralay will need at least two more tests before it can be operationalised.



Defence Research and Development Organisation (DRDO) successfully conduct the second flight test of indigenously developed surface-to-surface missile ‘Pralay’ from Dr A P J Abdul Kalam Island off the coast of Odisha, on Dec. 23, 2021; (PTI Photo)

The Pralay has a range of 50 to 500 km and will replace the liquid-fuelled Prithvi series ballistic missiles which have a maximum range of 350 km. The programme was launched four years ago to meet a specific Indian army operational requirements to engage targets like troop and vehicle

concentrations, logistic dumps and bases at ranges beyond the Prithvi and Brahmos missiles, using conventional munitions.

The SMART on the other hand allows warships to swiftly engage submarines at ranges between 50 and 650 km. The missile can carry a DRDO-developed Shenya light torpedo to pre-programmed ranges.

Both the Pralay and the SMART have a common ancestor—India's first submarine launched ballistic missile, the K-15, which equips the Arihant class SSBNs. The K-15 (now renamed the B-05) is a 10-metre long two-stage solid-fuelled manoeuvring ballistic missile with a range of 750 km. It was born out of the specific requirements to miniaturise a ballistic missile to fit the 11-metre diameter of the Arihant class submarine hull. The K-15 has a height of 10 metres at least five metres shorter than the Agni-1 missile which has a range of 700 to 1,200 km. The key according to a DRDO official lies in the new high energy solid rocket propellant designed for the K-15 by its Pune-based High Energy Materials Research Laboratory (HEMRL). The fuel not only has more energy than the solid fuel used in the Agni series solid propellant rockets, it also burns more efficiently.

“It was this discipline of making a missile small enough to fit the hull that drove us to perfect new technology,” a DRDO scientist says. A derivative of the K-15's solid booster technology was first used for the anti-satellite weapon (ASAT) which successfully destroyed a satellite in low earth orbit on March 27, 2019. The Indian ASAT tested under the Mission Shakti programme uses a 13 metre tall three-stage interceptor called the PDV Mk 2 derived from the K-15 programme.

<https://www.indiatoday.in/india-today-insight/story/the-k-factor-in-the-recent-missile-tests-1894315-2021-12-30>



Fri, 31 Dec 2021

DRDO giving Extreme Cold Clothing Technology to 5 Indian firms latest in 1,400 such tech-transfer pacts

The latest technology transfer is critical at a time India is locked in a military standoff with China at the LAC in eastern Ladakh and with the Army projecting a requirement of 50,000 to 90,000 sets of extreme cold winter clothing systems for soldiers.

By Amrita Nayak Dutta

In yet another collaboration with the private industry, the Defence Research and Development Organisation (DRDO) on Tuesday handed over the technology for the development of extreme cold winter clothing system (ECWCS) to five Indian companies.

The firms are Delhi-based M/s RHD Business Services India Pvt. Ltd and M/s SBNX Innovation (OPC) Pvt. Ltd, Coimbatore-based M/s Shiva Texyarn Limited, M/s Kusumgar Corporates Pvt. Ltd from Mumbai and M/s Ginni Filaments Limited in Mathura.

The technology was developed by the Defence Institute of Physiology and Allied Sciences (DIPAS) of DRDO and is particularly critical at a time when India is locked in a military standoff with China at the Line of Actual Control—and soldiers continue to be deployed in the forward areas of eastern Ladakh through the peak winters when the temperatures dip to about minus 30 degrees Celsius.

Earlier this year, the Army had projected an annual requirement of 50,000 to 90,000 sets of extreme cold weather clothing systems and similar quantities of special sleeping bags, rucksacks,

multipurpose boots as well as snow goggles and summer suits for super high altitude areas among others.

These extreme cold weather clothing systems were among the 17 types of special clothing and mountaineering equipment that the Army had sought to procure from Indian vendors.

So far, most of them are imported from other countries, but as per the second positive indigenisation list of 108 items notified by the Defence ministry earlier this year, special clothing and mountaineering equipment will have to be procured only from indigenous sources from January 2023.

Defence officials told News18.com that the DRDO's technology transfer to the private firms will go a long way in meeting this requirement for the Indian soldiers deployed in Siachen, eastern Ladakh and other high-altitude areas, in line with the Centre's Make in India initiative.



Earlier this year, the Army had projected an annual requirement of 50,000 to 90,000 sets of extreme cold weather clothing systems and similar quantities of special sleeping bags, rucksacks, multipurpose boots as well as snow goggles and summer suits for super high altitude areas. Representational pic/AFP

What is the technology all about and how will it help soldiers?

DRDO officials told News18.com that the extreme cold weather clothing systems are ergonomically designed, modular in nature and comprise three layers, weighing less than 4.5 kg, even for the largest sizes.

The inner layer comprises a vest and a pair of trousers and provides insulation and wicks away sweat from the body, while the middle layer, comprising a jacket and trousers, provides maximum insulation and is resistant to water penetration on the outer surface.

The outer part is a camouflage printed insulated waterproof layer providing protection from wind chill and snow and is reversible.

The insulation was distributed in three layers of clothing for temperatures up to minus 50 degrees Celsius.

The officials said the ergonomic design of the clothing system will facilitate non-obstructive natural joint movements on wearing the winter clothing systems and will ensure minimum restriction to the range of motion of different body joints, thus maintaining flexibility and manoeuvrability of the user. It is designed in a way to provide protection to the face during extreme cold and blizzards. It will also prevent dehydration and minimise temperature loss through breathing during activities.

The clothing system, officials said, will provide warmth and comfort to soldiers in high-altitude areas up to 30,000 feet and glaciated terrains in temperatures up to minus 50 degrees Celsius and wind velocity up to 60 km/hr, while preventing hypothermia and minimising the risks of frostbite and maintaining normal body temperature.

DRDO's collaborations with private industry

While officials said that DRDO does not have immediate projects lined up for such collaborations with the industry, the organisation has carried out more than 1400 ToT (transfer of technology) agreements with various industries to date.

An official said this year alone, DRDO has carried out 178 ToT agreements with the private industry. Some of the technologies that were recently transferred to the private industry include Fire Suppressing Gel, Coastal Surveillance Radar, Automatic Chemical Agent Detection and Alarm (ACADA) & Chemical Agent Monitor (CAM), Unit Maintenance Vehicle, Unit Repair Vehicle, Fused Silica-based Ceramic Core technology.

DRDO gets five per cent of the total development cost as ToT fees from each industry, officials from the organisation told News18.com.

<https://www.news18.com/news/india/drdo-giving-extreme-cold-clothing-technology-to-5-indian-firms-latest-in-1400-such-tech-transfer-pacts-4609679.html>

DRDO on Twitter



IAF Chief holds talk with top military brass of RoK to strengthen bilateral military ties

Air Chief Marshal VR Chaudhari, Chief of Air Staff, met with Republic of Korea's top military commanders to discuss ways to strengthen bilateral military ties.

By Aparna Shandilya

Air Chief Marshal VR Chaudhari, the Chief of Air Staff (CAS), met with the Republic of Korea's top military commanders to discuss ways to strengthen bilateral military ties. Since Monday, the IAF chief has been on a four-day tour to the Republic of Korea. At the third India-Republic of Korea strategic conversation, held in the national capital on December 3, the two sides reviewed a number of crucial subjects.

India and the Republic of Korea agreed earlier this month to deepen strategic collaboration, including in combating terrorism, extremism, and radicalization. India has received a lot of weapons and military equipment from South Korea. In 2019, the two countries agreed on a roadmap for collaborative manufacturing of a variety of land and naval systems. After becoming Chief of Air Staff, Air Chief Marshal Chaudhari is making his second trip abroad. He was in Egypt just a few weeks ago.



Image: Twitter/IAF_MCC

Army Chief visits South Korea

Moreover, Army Chief Gen. MM Naravane launched a three-day visit to the Republic of Korea on December 27, holding comprehensive talks with the country's top military leadership to improve strategic cooperation amid rising concerns about China's military muscle-flexing in the region. PTI reported citing the officials in Seoul that Gen Naravane met with Minister of National Defense Suh Wook, Chairman of the Joint Chiefs of Staff Gen Won In Choul, and Minister of Defense Acquisition Planning Administration Gang Eun Ho.

The aim of the talks, according to them, was to deepen strategic and defence collaboration between the two countries. In the previous decade, India and South Korea's defence and security ties have become stronger due to a rising convergence of interests between the two countries in a variety of areas, particularly the maritime domain.

India has benefited greatly from the East Asian country's military platforms and armaments. Indian policymakers believe that expanding collaboration in producing equipment related to aeronautics, shipbuilding, electronics, and missile technology is a major opportunity. The South Korean military is regarded as one of the world's most powerful professional armies, and it frequently works alongside US troops and conducts regular drills with American and other regional armed forces.

According to a military official, expanding Chinese control in the South China Marine and the security of sea lines of communication are important concerns for South Korea, and the country views India as a stabilising factor in the Indian Ocean region. Because of the ongoing tensions with North Korea, the South Korean military maintains a high level of readiness, and policymakers in New Delhi believe that expanding bilateral military cooperation and exchanges will benefit the Indian armed forces significantly.

<https://www.republicworld.com/india-news/general-news/iaf-chief-holds-talk-with-top-military-brass-of-rok-to-strengthen-bilateral-military-ties-articleshow.html>

THE TIMES OF INDIA

Fri, 31 Dec 2021

Air Commodore KAA Sanjeeb becomes Sulur Air Base Chief

By Subburaj

Coimbatore: The Indian Air Force (IAF) has appointed Air Commodore Kondengalara Aboo Ahamed Sanjeeb (KAA Sanjeeb) as the chief of the Base Repair Depot (BSD), Air Force Station, Sulur on Wednesday.

The Air Commodore KAA Sanjeeb took charge Wednesday. Air Commodore P K Sreekumar handed over Command of the BRD to Air Commodore KAA Sanjeeb. A solemn handing over/taking over ceremony was conducted which was attended by select guests and personnel of the station on Wednesday.

The tenure of Air Commodore PK Sreekumar saw many milestone events including the passing out of 100th Dornier aircraft after servicing. The new incumbent, Air Commodore KAA Sanjeeb, brings-in rich experience, having been associated with the maintenance of transport fleet of the IAF including the frontline AWACS (airborne warning and control system) aircraft. His experience of driving 'Atma Nirbharta' projects from Air Headquarters will contribute to driving projects towards 'Self Reliance' with the help of industries in the Coimbatore region.

The posting happens a few weeks after a chopper crash near Coonoor claimed the lives of 14 people including the country's first Chief of Defence Staff General Bipin Rawat. The Mi-17V5 chopper carrying General Bipin Rawat and others were flying from Sulur Air Force Station to Defence Services Staff College in the Nilgiris on December 8 when the crash happened.

When contacted, defence officials said it was a routine transfer. They said it could not link the transfer with the chopper crash.

<https://timesofindia.indiatimes.com/city/coimbatore/air-commodore-kaa-sanjeeb-becomes-sulur-air-base-chief/articleshow/88591754.cms>



Air Commodore P K Sreekumar handed over the Command of the BRD to Air Commodore KAA Sanjeeb (right).

Awakening in India's defence production as ministry puts curbs on imports

As part of achieving greater self-sufficiency in the defence manufacturing sector, imports of 351 items of equipment have been restricted recently. Earlier, 209 items of arms and equipment required for the defense forces were removed from the import list. The arms imports have been slashed again with the aim of increasing the supply of arms, ammunition and other equipment to the troops from the country's best-performing defence manufacturers. It is imperative that India, the world's second-largest arms importer, become increasingly self-sufficient in this field. Over the past five years, arms imports have fallen by thirty-six percent. As a result, the benefit to the defence manufacturing companies in the country is over Rs 70,000 crore. It should be considered a great achievement to be able to produce such a large amount of weapons in these institutions. It is true that when arms imports fall, our allies, who regularly supply them, will naturally have some annoyances. But as long as the right to look after the interests of one's own country is not subordinated to anyone, the displeasure of the major powers involved in arms exports need not be given much importance.

We have been able to make commendable achievements in the development and production of defence equipment. Much progress has been made in the field of rockets, missiles, and numerous products for the Army. The various needs of the Navy and Air Force have eliminated the need for over-reliance on foreign countries. India now has the capability to design and build its own aircraft carriers and submarines.

Self-sufficiency in defence production is not limited to weapons production. It is also a platform for young talent and technologists to showcase their talents. The potential for new jobs is also high. Under the 'Atmanirbhar Bharat' scheme announced by Prime Minister Narendra Modi, the import of a large number of ammunition is being phased out. Imports of 209 items were previously restricted. In addition, 351 new items have been added to the import restrictions list. It is proposed that over the next three years, these be produced entirely at the defence plants here. This would save about Rs 3,000 crore in foreign currency every year. When the listed materials are purchased from companies in the country, there will be a lot of new jobs. Import curbs will be implemented in stages so that the displeasure of the countries that currently supply them can be avoided.

The country will not be able to cut defence spending in the face of ever-conflicting borders. At the same time, self-sufficiency in weapons and other military equipment can significantly reduce the cost of imports. Laser sensors, high pressure valves, beacon receivers, cables, sockets, and voltage control oscillators can all be manufactured here. Many industries here will benefit by avoiding these imports. This is not a difficult task for a country that has the capability to build even intercontinental ballistic missiles. To this day, the barriers to self-sufficiency in the field are the massive fraud and embezzlement in the production and import of defence equipment.

<https://keralakaumudi.com/en/news/news.php?id=718940&u=>

India, Russia to boost defence ties in Indian Ocean region

By Dipanjan Roy Chaudhury

Synopsis

While Vietnam and Iran could be two partners for trilateral exercises given their close defence partnership with Moscow, there could be other South Asian & SE Asian countries which can be in fray.

India and Russia, are not only exploring joint projects in Central Asian Region, but also exploring partnership in the Indian Ocean Region (IOR), often viewed as New Delhi's backyard.

The prospective partnership in IOR figured at the maiden 2+ 2 Ministerial meet on December 6. The agenda of cooperation may include additional port calls by Russian Navy ships to Indian ports, increasing joint exercises in the Indian Ocean Region (IOR) and even trilateral naval exercises with friendly countries in the IOR, ET has learnt.

While Vietnam and Iran could be two partners for trilateral exercises given their close defence partnership with Moscow, there could be other South Asian & SE Asian countries which can be in fray. A MoU between India and Russia on Navy to Navy Cooperation is expected to be signed in 2022.

Russia has recently enhanced its ties with Sri Lanka and key ASEAN states with its NSA undertaking a visit to the region. . India has backed an inclusive Indian Ocean Region and Indo-Pacific region and Russia's interest in these geographical zones will contribute to that goal, according to an informed source.

Russia's inclusion as a dialogue partner of the Indian Ocean Rim Association (IORA) has opened up a slew of opportunities for collaboration with India that also include a scientific and research endeavors.

It may be recalled that India had backed Russia's application to become IORA dialogue partner and has been nudging Moscow to play a role in IOR. India and Russia will sign the Reciprocal Exchange of Logistics Agreement (RELOS) in near future.

In a recent piece titled, 'India-Russia Cooperation in Indian Ocean Region, Arctic and Russian Far East' Anurag Bisen (Research Fellow) of the Institute of Defence Studies Analyses wrote, "India's central position in the northern IOR bestows upon it a unique role. Several extra-regional nations look up to India as the first responder in a calamity, a net provider of security in the region, and seek collaborative partnerships with India in the maritime domain...Russia is the only major power without a permanent presence in the IOR. Although few observers consider Russia to be an active player in the Indian Ocean, it has long sought to establish permanent bases in the region. Recently, on 17 November 2021, Russia's inclusion as a dialogue partner of the Indian Ocean Rim Association (IORA) suggests the implicit acceptance of its important role in the evolving geopolitics of the Indian Ocean."

In its National Maritime Doctrine of 2015, Russia had pointed out 'development of friendly relations with India' as the most important objective in the Indian Ocean Region.

Russia now plays an active role in anti-piracy operations off the coast of Somalia and has also emerged as a major partner for Mozambique and Madagascar besides announcing the setting up of a naval facility in Sudan (this increases Russian Navy's access in the West Asian region). It is interesting to note that Moscow has increased its contacts with India's neighbours in IOR. Russia



In its National Maritime Doctrine of 2015, Russia had pointed out 'development of friendly relations with India' as the most important objective in the Indian Ocean Region.

and Sri Lanka have increased their cooperation in defence and military spheres over the past few years. There are also reports that Russia aims to acquire a naval base in Myanmar.

<https://economictimes.indiatimes.com/news/defence/india-russia-to-boost-defence-ties-in-indian-ocean-region/articleshow/88603562.cms>



Fri, 31 Dec 2021

China replaces 'soldiers with robots' in Tibet as soldiers 'fleeing' in harsh winters

Story highlights

Chinese forces had been struggling to operate in high-altitude environments. China is sending dozens of unmanned vehicles to the Indian border.

New Delhi: As the unsolved India-China border dispute brews tensions, new media reports allege that China is sending machine gun-wielding robots to the frontier to exacerbate the situation.

According to Indian media reports, dozens of autonomous vehicles capable of transporting both weapons and supplies are being dispatched to Tibet, with the bulk being deployed in border regions where Chinese troops are engaged in a standoff with Indian troops.

The Sharp Claw, which can be handled wirelessly and is armed with a light machinegun, and the Mule-200, which is meant as an unmanned delivery truck but can also be equipped with weaponry, are two examples of vehicles.

China is now supplying troops with MUL-200 unmanned vehicles, while also giving guns to its military.

Around 120-200 mules have also been dispatched to Tibet, the majority of which will be stationed near the border.

China has also provided 70 VP-22 armoured military vehicles to supplement the unmanned vehicles.

Seventy-seven of these are in border areas. A total of 150 Lynx all-terrain vehicles have been dispatched to the border. The Lynx is employed by a wide range of armies and is frequently utilised to carry troops.

It is also used to deploy a variety of armament systems, such as howitzers, heavy machine guns, mortars, and missile launchers.

The region, which is exceedingly arid, remote, and mainly inhospitable, has little practical use beyond a few commerce routes that crisscross its deserts, but it carries symbolic significance for both parties eager to demonstrate supremacy.

Tensions rose in 2020 as Chinese and Indian troops engaged in hand-to-hand combat, with many dead in clashes fought with melee weapons such as nail-studded clubs.

<https://www.wionews.com/india-news/china-replaces-soldiers-with-robots-in-tibet-as-soldiers-fleeing-in-harsh-winters-441159>



A Mule-200 unmanned ground vehicle. Photograph:(Twitter)



Scientists develop high-performance transistor models and circuits useful for space and defense applications

Indian researchers have developed a high performance industry-standard model for Aluminium gallium nitride (AlGaN/GaN) High Electron Mobility Transistors (HEMTs) with simple design procedures which can be used to make high-power Radio Frequency (RF) circuits owing to its high breakdown voltage.

Radio Frequency circuits include amplifiers and switches, which are used in wireless transmission and are useful for space and defense applications.

As AlGaN/GaN HEMTs can also extend the power level of solid-state microwave circuits by a factor of five to ten, resulting in an appreciable reduction in the overall chip size and cost, the standard developed can significantly reduce the development cost of the circuits and devices for transmitting high-frequency signals.

The technology is rapidly gaining popularity owing to its high performance and efficiency. It has two excellent properties – high mobility and high-power performance. These properties reduce the noise figure and complexity while designing Low Noise Amplifiers (LNAs) (used in wireless transmission like mobile phones, base stations) while increasing the achievable bandwidth.

AlGaN/GaN HEMTs have become the technology of choice for high-frequency and high-power applications like 5G, radars, base stations, satellite communications, etc. To design wideband power amplifiers, a fully robust and accurate physics-based radio frequency (RF) GaN HEMT model is of prime importance.

In the current work, the team led by Prof. Yogesh Singh Chauhan at IIT Kanpur developed and standardized a physics-based compact model for AlGaN/GaN HEMTs – the Advanced Spice Model for GaN-HEMTs (ASM-HEMT). The standard model for circuit design developed simplifies the design procedure for high-performance RF circuits and helps in automating the design efforts as well as brings down the overall development cost. Besides, it can accurately predict the AlGaN/GaN HEMT's behavior in circuit design.

The development of the model involved characterizing AlGaN/GaN HEMTs using state-of-the-art characterization systems integrated in a setup used for measuring the electronic characteristics like current, the capacitance of semiconductor devices, including high-frequency characteristics.

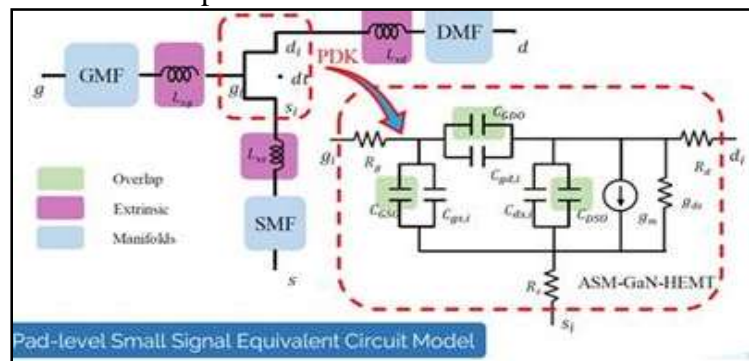


Figure: A small-signal equivalent of the industry-standard ASM-HEMT model.

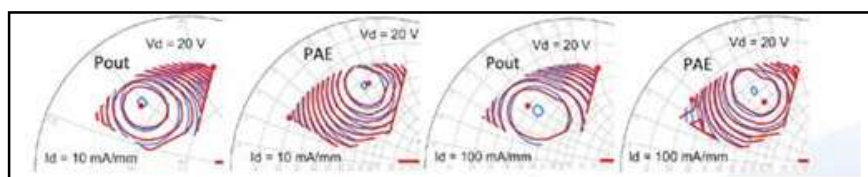


Figure 3: Large-signal load-pull contours modeled accurately using the industry-standard ASM-HEMT model.

This setup (consisting of a Keysight B1500 Semiconductor Device Analyzer, an AMCAD PIV system, a passive load-pull system from Maury Microwaves, a Keysight B1505 Power Device analyzer, all connected using a FormFactor probe station) was partially supported by ‘Fund for Improvement of S&T Infrastructure (FIST)’ and Technology Development Programme (TDP) schemes of Department of Science and Technology.

The measurements facility funded by FIST & TDP is being heavily used by ISRO, DRDO, and other companies to characterize the semiconductor devices for high-frequency applications.

Prof. Chauhan’s team measures the current, capacitance, and RF characteristics of the devices under test and uses parameter extraction tools to extract the parameters of the ASM-HEMT model for a given technology. Once the model behavior is in close agreement with the measured characteristics, the model is validated for practical applications.

The team is concurrently working on circuit design and has delivered a state-of-the-art commercial GaAs-based LNA with one of the lowest reported noise figures in the market. Ongoing efforts include LNA, and PA design based on the AlGaIn/GaN material system.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1786322>



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Ministry of Science & Technology

Thu, 30 Dec 2021 4:39PM

Long lived correlations between waves in atomic systems at ultralow temperatures can be exploited for efficient quantum computing

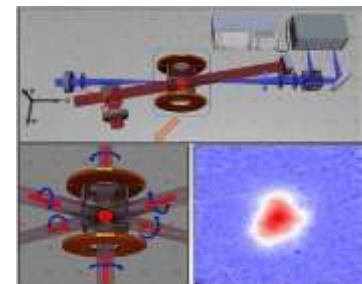
Correlations between waves in atomic systems or spin coherences are long-lived at ultralow temperatures, says a new study by scientists who have developed a new technique to measure it. A system with long-lived spin coherences is a better resource as quantum computer. It allows quantum operations and logic gates to be more efficiently implemented so that the system becomes a better quantum sensor compared to systems where coherence is short-lived.

This newly explored property of atomic systems at low temperature can be exploited for efficient quantum sensing and quantum information processing for application in quantum computation and secure communication. The newly discovered

technique can help study the real-time dynamics of quantum phenomena such as quantum phase transitions in a non-invasive manner.

Spin is a fundamental quantum property of atoms and elementary particles such as electrons and protons. As atoms are cooled to lower temperatures, their quantum nature is manifested more prominently. However, while the spin degree of freedom is a highly discussed topic, especially in the context of quantum information processing, the dynamical measurements on spins at ultralow temperatures were not available. This is because most of the detection techniques in cold atom experiments are destructive and disturbs the atomic sample during detection.

A team of Scientists from Raman Research Institute, Bangalore, an autonomous institute of the Department of Science & Technology, Govt. of India, have measured the spin properties of atoms cooled to micro-Kelvin temperatures using the new method they have devised. Quantum properties dominate over everyday classical observations at this temperature — very near absolute zero temperature, and it is for the first time that spin dynamics have been detected at this temperature regime using polarization fluctuation measurements.



With the new technique, the scientists measured the properties of spins and lifetime of an atomic spin state with a million-fold improvement in detection sensitivity compared to the existing technology. They proved that spin coherence at this low temperature is long-lived.

In this work led by Sanjukta Roy, Dibyendu Roy, and Saptarishi Chaudhuri and co-authored by Ph.D. students Maheswar Swar and Subhajit Bhar from RRI increased signal strength of spin noise by a million-fold by using coherent laser drive. They made the spin noise spectroscopy technique usable for spectroscopists measuring systems where signal level is too low to detect. The research has been published in the journal Phys. Rev. Research. The work has been financially supported by funding from DST (Department of Science and Technology) and MeitY (Ministry of Electronics and Information Technology).

According to the RRI team, this work derives its original motivation from Nobel laureate Sir C V Raman's seminal work on light scattering. They used laser cooling techniques to cool down the neutral atoms near absolute zero temperatures and used laser light to coherently drive quantum transitions in these cold atoms and a polarimetric detection technique to precisely detect the spin dynamics in these atoms. Eventually, they determined the lifetime of the spins in cold atoms and found them to be long-lived – nearly a millisecond, which is at least a thousand times more than the spin lifetime of the atoms at room temperature. The RRI team explained the observations with the help of a theoretical framework based on advanced quantum mechanical concepts.

“In this novel technique, the spin-dynamics of the atoms could be detected at the single-atom level instead of the bulk properties detected using available techniques,” the RRI team said, explaining the importance of the new technique.

According to the team, this technology can be used to make devices that can precisely detect small magnetic fields, which has important applications in mining and prospecting. The work also has important applications in biomedical imaging, where time-resolved measurements of small magnetic fields are required.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1786323>



पत्र सूचना कार्यालय
भारत सरकार

विज्ञान एवं प्रौद्योगिकी मंत्रालय

Thu, 30 Dec 2021 4:39PM

परमाणु तंत्र में अल्ट्रा लो तापमान पर तरंगों के बीच लंबे समय तक रहने वाले सहसंबंधों का लाभ प्रभावी क्वांटम कंप्यूटिंग के लिए उठाया जा सकता है

वैज्ञानिकों द्वारा तरंगों को मापने के लिए विकसित की गई नई तकनीक की मदद से एक अध्ययन किया गया है जिसमें यह पता चला है कि एटॉमिक सिस्टम में अल्ट्रा लो तापमान पर तरंगों का सह संबंध लंबे समय तक रहता है। लंबे समय तक रहने वाली स्पिन सुसंगतता वाला सिस्टम क्वांटम कंप्यूटर के रूप में एक बेहतर संसाधन है। यह क्वांटम संचालन और लॉजिक गेट्स को अधिक कुशलता से लागू करने में सुलभ बना देता है। इसकी मदद से सिस्टम उन प्रणालियों की तुलना में बेहतर क्वांटम सेंसर बन सकता है जहां सुसंगतता अल्पकालिक है।

परमाणु प्रणालियों में कम तापमान पर खोजी गई इस नई तकनीक का उपयोग कुशल क्वांटम सेंसिंग और क्वांटम सूचना प्रसंस्करण में क्वांटम गणना और सुरक्षित संचार में लागू करने के लिए किया जा सकता है। नई खोजी गई तकनीक बिना किसी बदलाव के क्वांटम चरण संक्रमण जैसे क्वांटम फेनोमेना की रीयल टाइम में गतिशीलता का अध्ययन करने में मदद कर सकती है।

स्पिन, परमाणु और इलेक्ट्रॉनों तथा प्रोटॉन जैसे प्राथमिक कणों की एक मौलिक क्वांटम प्रॉपर्टी होती है। परमाणुओं को जैसे-जैसे कम तापमान पर ठंडा किया जाता है, उनकी क्वांटम प्रकृति अधिक प्रमुखता से सामने आती है। हालांकि स्पिन डिग्री मुक्त होती है इस पर तो काफी चर्चा होती रहती है, लेकिन विशेषरूप से क्वांटम सूचना प्रसंस्करण के संदर्भ में अल्ट्रा लो तापमान में स्पिन पर गतिशील माप उपलब्ध नहीं था। ऐसा इसलिए था क्योंकि ठंडे परमाणु प्रयोगों में अधिकांश पता लगाने की तकनीक निष्क्रिय हो जाती है और पता लगाने की प्रक्रिया में परमाणु नमूने को बाधित करती है।

भारत सरकार के विज्ञान और प्रौद्योगिकी विभाग के एक स्वायत्त संस्थान, रमन अनुसंधान संस्थान, बेंगलूर के वैज्ञानिकों की एक टीम ने स्वयं की तैयार की गई नई विधि का उपयोग करके सूक्ष्म-केल्विन तापमान तक ठंडा किए गए परमाणुओं के स्पिन गुणों को मापा है। आमतौर पर इस तापमान (पूर्ण शून्य तापमान के बहुत करीब) पर अध्ययन में क्वांटम प्रॉपर्टी प्रभावी होती है, लेकिन यह पहली बार है कि ध्रुवीय उतार-चढ़ाव माप का उपयोग करके इस तापमान व्यवस्था में स्पिन गतिकी का पता लगाया गया है।

नई तकनीक की मदद से वैज्ञानिकों ने स्पिन की प्रॉपर्टी और एक परमाणु स्पिन के पूरे जीवनकाल को पता लगाने की संवेदनशीलता में मौजूदा तकनीक की तुलना में लाखों गुणा सुधार किया है और स्पिन के गुणों को मापा है। उन्होंने साबित किया कि इस कम तापमान पर स्पिन सुसंगतता लंबे समय तक रहती है।

इस अध्ययन के लिए वैज्ञानिकों के दल का नेतृत्व किया संजुक्ता रॉय, दिब्येंदु रॉय और सप्तऋषि चौधरी ने तथा आरआरआई के पीएच.डी. छात्र महेश्वर स्वर और सुभाजीत भर ने सुसंगत लेजर ड्राइव का उपयोग करके स्पिन शोर की सिग्नल शक्ति को दस लाख गुना बढ़ा दिया। उन्होंने स्पिन शोर स्पेक्ट्रोस्कोपी तकनीक को स्पेक्ट्रोस्कोपिस्ट मापने वाली प्रणालियों के लिए प्रयोग करने योग्य बनाया जहां सिग्नल का स्तर बहुत कम होता है जिससे पता चलना मुश्किल होता है। यह शोध फिजिकल जर्नल में प्रकाशित हुआ है। इस शोध के लिए वित्तीय सहायता इलेक्ट्रॉनिकी और सूचना प्रौद्योगिकी मंत्रालय (एमईआईटीवाई) के विज्ञान और प्रौद्योगिकी विभाग (डीएसटी) द्वारा उपलब्ध कराई गई।

आरआरआई के इस शोध दल के अनुसार, यह कार्य नोबेल पुरस्कार विजेता सर सी वी रमन के प्रकाश प्रकीर्णन पर मौलिक कार्य से मूलतः प्रेरित है। उन्होंने निरपेक्ष शून्य तापमान के पास तटस्थ परमाणुओं को ठंडा करने के लिए लेजर शीतलन तकनीक का उपयोग किया और इन ठंडे परमाणुओं में क्वांटम संक्रमणों को सुसंगत रूप से चलाने के लिए लेजर प्रकाश का उपयोग किया और इन परमाणुओं में स्पिन गतिकी का ठीक-ठीक पता लगाने के लिए एक पोलरिमेट्रिक डिटेक्शन तकनीक का उपयोग किया। आखिरकार, उन्होंने ठंडे परमाणुओं में स्पिन के जीवनकाल को निर्धारित किया और पाया कि वे लंबे समय तक लगभग एक मिलीसेकंड जीवित रहे, जो कमरे के तापमान पर परमाणुओं के स्पिन जीवनकाल से कम से कम एक हजार गुना अधिक है। आरआरआई टीम ने उन्नत क्वांटम यांत्रिक अवधारणाओं के आधार पर सैद्धांतिक ढांचे की मदद से अवलोकनों को समझाया।

आरआरआई टीम ने इस नई तकनीक के महत्व के बारे में बताते हुए कहा कि जहां पहले से उपलब्ध तकनीक का उपयोग करके समूह में परमाणु गुणों का पता लगाया जाता था वहीं इस नई महत्वपूर्ण तकनीक की मदद से परमाणुओं की स्पिन-गतिशीलता का एकल-परमाणु स्तर पर पता लगाया जा सकता है।"

अध्ययन दल के अनुसार, इस तकनीक का उपयोग ऐसे उपकरण बनाने के लिए किया जा सकता है जो छोटे चुंबकीय क्षेत्रों का सटीक रूप से पता लगा सकते हैं, जिनका उपयोग खनन और पूर्वक्षण में महत्वपूर्ण होता है। यह अनुसंधान बायोमेडिकल इमेजिंग के लिए भी महत्वपूर्ण होगा, जहां छोटे चुंबकीय क्षेत्रों के समय-समाधान माप की आवश्यकता होती है।

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