



05 October 2024

Fluorescent Nano Diamonds (FNDs)

Context: In a recent study published in Nature Communications, physicists from Purdue University achieved a significant breakthrough by levitating Fluorescent Nano Diamonds (FNDs) in a high vacuum and spinning them at ultra-fast rates.

- This experiment has major implications for quantum mechanics and various industrial applications, opening new doors for scientific research.

What are Fluorescent Nano Diamonds (FNDs)?

- Fluorescent Nano Diamonds (FNDs) are nanometre-sized diamonds made of carbon nanoparticles. They are produced under high temperatures and pressures, making them extremely stable and non-toxic to living organisms. FNDs have several unique features:
 - » **High Stability:** They do not degrade when exposed to light, unlike many other fluorescent materials.
 - » **Non-toxic Nature:** This makes them safe for use in biological applications, such as tracking cells over long periods.

Fluorescence and Stability of FNDs:

- Fluorescence is the ability of a material to emit lower-frequency light when irradiated with higher-frequency light.
- FNDs stand out because they do not blink (an intermittent pattern of light emission) like other nanoscale materials.
- Their fluorescence lifespan exceeds 10 nanoseconds, making them more reliable for long-term applications than quantum dots, which won the 2023 Nobel Prize in Chemistry.

Quantum Spin and the Berry Phase:

- FNDs are valuable in the field of quantum mechanics due to their ability to manipulate the spin of particles, such as electrons. Spin is a fundamental quantum property that allows particles to exist in different states—important for quantum computing, where spin qubits store information.
- The Berry phase is a key concept in quantum mechanics that describes how the phase of a particle's wave changes after it moves through different quantum states

and returns to its original state.

- This phenomenon plays a key role in:
 - » **Quantum mechanics:** It helps explain certain behaviours of particles in magnetic fields and rotating systems.
 - » **Quantum gravity research:** By measuring the Berry phase in complex systems like levitated FNDs, researchers hope to probe deeper into quantum gravity and explore the boundaries of how quantum mechanics interacts with gravity, which remains one of the biggest challenges in physics.



Industrial Applications of FNDs:

- Levitated FNDs have significant industrial potential due to their sensitivity to acceleration and electric fields. This makes them ideal for use as sensors in various high-value industries. Some possible applications include:
 - » **Sensor Technologies:** FNDs can be used in advanced sensors and gyroscopes for precise rotation sensing.
 - » **Quantum Computing:** FNDs can be doped with nitrogen to create nitrogen-vacancy (NV) centres, which allow electron spin qubits to exist, supporting future quantum superposition experiments and computing advancements.

Other Applications of FNDs:

- **Medical Diagnostics:** Due to their non-toxic nature and high stability, FNDs are used for high-resolution imaging and long-term tracking of cells.
- **Temperature Sensing:** FNDs can measure temperatures at the micro-scale, making them useful for scientific experiments in various fields.
- **Correlative Microscopy:** Their fluorescent properties

Face to Face Centres



05 October 2024

make FNDs ideal for combining multiple imaging techniques, enhancing the accuracy of microscopic observations.

Union Cabinet Approves Five Languages as “Classical”

Context: The Union Cabinet has recognized five additional languages—Marathi, Pali, Prakrit, Assamese, and Bengali—as “classical languages.”

- This decision expands the list of culturally significant languages in India and underscores the government’s commitment to preserving linguistic heritage.

Significance:

- The inclusion of these languages reflects nation’s focus on promoting Indian languages. With this decision, these languages join the ranks of six other languages already designated as classical: Tamil, Sanskrit, Telugu, Kannada, Malayalam, and Odia.
- The classification of a language as “classical” ensures increased academic and cultural interest and opens up new avenues for research and preservation of these ancient tongues.

Criteria for Classical Language Recognition:

- The recognition of a classical language is based on specific criteria established by a Linguistic Experts Committee. These include:
 - » **High Antiquity:** The language must have early texts and a recorded history spanning over 1,000 years.
 - » **Ancient Literature:** A significant body of ancient literature, valued as cultural heritage, must exist.
 - » **Knowledge Texts:** The language should have a corpus of prose, including knowledge texts and epigraphically evidence.
 - » **Distinct Evolution:** The classical language and its literature must be distinct from their modern forms, with potential evolution resulting in discontinuity from their original structure.

Constitutional Context:

- Under Article 343(1) of the Indian Constitution, Hindi in Devanagari script is the official language of the

Union, while Section 3 of the Official Language Act, 1963, allows for the continuance of English for official purposes.

- The Eighth Schedule of the Constitution enumerates the official languages of the Republic of India, currently comprising 22 languages, including the newly recognized classical languages.
- Official Language Commission: The Official Languages Commission is established by the President of India under Article 344 of the Indian Constitution. It was constituted in 1955 through a notification from the Ministry of Home Affairs.

Languages Listed in the Eighth Schedule:

Assamese	Hindi	Bodo
Bengali	Dogri	Punjabi
Gujarati	Kannada	Sanskrit
Kashmiri	Malayalam	Sindhi
Konkani	Maithili	Tamil
Manipuri	Marathi	Santhali
Nepali	Telugu	Urdu
Oriya		

Benefits of Inclusion Under the Eighth Schedule:

The recognition of languages in the Eighth Schedule provides several advantages:

- **Literary Recognition:** The National Sahitya Akademi automatically recognizes the languages of the Schedule as literary languages.
- **Medium of Instruction:** The Eighth Schedule plays a critical role in determining the medium of instruction in secondary schools, ensuring the use of modern Indian languages and English.
- **Competitive Examinations:** Languages included in the Eighth Schedule are utilized in various All-India competitive examinations conducted for higher education and employment.

The recent decision to recognize five additional languages as classical represents a significant step in preserving India’s rich linguistic heritage. By promoting academic interest and research opportunities, this initiative is expected to foster a deeper appreciation for these languages and their contributions to India’s cultural landscape.

Face to Face Centres



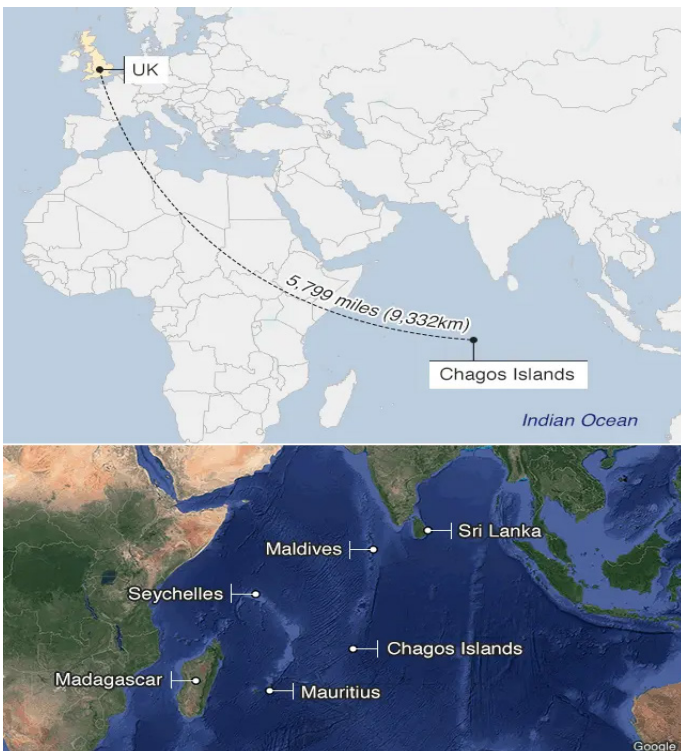
05 October 2024

Britain Returns Chagos Islands to Mauritius

Context: Britain has agreed to return sovereignty of the Chagos Islands to Mauritius, ending a longstanding dispute over the UK's last African colony.

Background:

- The Chagos Islands have been a point of contention between the UK and Mauritius since the 1960s when the UK detached the archipelago from Mauritius before its independence. Mauritius has consistently claimed the Chagos Archipelago as part of its territory, while the UK has maintained its sovereignty over the islands.



About the agreement:

- The agreement, reached after 13 rounds of negotiations that began in 2022, will return sovereignty of the Chagos Islands to Mauritius. However, the UK will retain control over Diego Garcia, a critical military base for the United States. This arrangement allows continued US military operations in the region.

Key developments before this agreement:

- The legal dispute over the Chagos Islands has been brought before various international bodies, including the International Court of Justice (ICJ), which ruled in 2019 that the UK's administration of the Chagos Archipelago was unlawful and that it should be returned to Mauritius.
- The same year, the UN General Assembly adopted a resolution affirming that the Chagos Archipelago is part of Mauritius' territory and calling for the UK to withdraw its colonial administration.
- In 2022, as part of the ongoing sovereignty campaign, Mauritian ambassador Jagdish Koonjul symbolically raised the Mauritian flag over Peros Banhos, one of the islands in the Chagos Archipelago.
- Historical Context:** Britain has controlled the Chagos Islands since 1814. In 1965, the UK separated the islands from Mauritius to create the British Indian Ocean Territory as part of its colonial strategy.
- This move also involved the forced relocation of nearly 2,000 residents, which has been widely condemned and classified as a crime against humanity.

About the Chagos Archipelago:

- The Chagos Archipelago is a group of seven atolls made up of over 60 islands located in the Indian Ocean. It is the southernmost archipelago of the Chagos–Laccadive Ridge and features low-lying atolls surrounding lagoons.

Land Area:

- The total land area of the Chagos Archipelago is 56.13 km² (21.7 sq. miles). Diego Garcia, the largest island, covers 32.5 km².
- Other notable islands include the Salomon Islands, Nelsons Island, and Peros Banhos.

Union Cabinet Approves Rationalization of Centrally Sponsored Agricultural Schemes

Context: The Union Cabinet, chaired by Prime Minister Narendra Modi, has recently approved the Department of Agriculture & Farmers Welfare's (DA&FW) proposal to rationalize all Centrally Sponsored Schemes

Face to Face Centres





05 October 2024

(CSS) operating under the Ministry of Agriculture and Farmers' Welfare.

More about the News:

- The two umbrella schemes have been rationalized namely: the Pradhan Mantri Rashtriya Krishi Vikas Yojana (PM-RKVY) and the Krishonnati Yojana (KY). This strategic move aims to streamline existing schemes and enhance their effectiveness in promoting sustainable agriculture and ensuring food security.
- Both schemes will be implemented with a total proposed expenditure of ₹1,01,321.61 crore and will be executed through state governments. The new structure aims to leverage technology to ensure efficient implementation across various components.
- Out of the total projected expenditure of ₹1, 01,321.61 crore, the funding is allocated as follows:
 - » Central Share of Department of Agriculture, Cooperation and Farmers Welfare: ₹69,088.98 crore
 - » State Share: ₹32,232.63 crore

Key Features of the New Schemes

Pradhan Mantri Rashtriya Krishi Vikas Yojana (PM-RKVY):

- **Focus:** Sustainable agriculture and enhancing farmers' welfare.
- **Structure:** A cafeteria scheme allowing for flexibility and customization to meet state-specific needs.
- **Financial Allocation:** Projected expenditure of ₹57,074.72 crore.

Components of PM-RKVY

- The PM-RKVY will encompass various schemes aimed at enhancing agricultural productivity and sustainability, including:
 - » Soil Health Management

- » Rainfed Area Development
- » Agro Forestry
- » Paramparagat Krishi Vikas Yojana
- » Agricultural Mechanization (including Crop Residue Management)
- » Per Drop More Crop
- » Crop Diversification Programme
- » RKVY DPR Component
- » Accelerator Fund for Agri Startups

Krishonnati Yojana (KY):

- **Focus:** Addressing food security and promoting agricultural self-sufficiency.
- **Financial Allocation:** Projected expenditure of ₹44,246.89 crore.

Objectives of the Rationalization:

The rationalization of the schemes is intended to achieve several objectives:

- **Avoid Duplication:** Ensures convergence of efforts and resources to avoid redundancy in initiatives.
- **Address Emerging Challenges:** Focuses on pressing issues such as nutrition security, sustainability, climate resilience, value chain development, and private sector participation.
- **Holistic Strategic Planning:** Allows states to prepare comprehensive strategic documents for their agricultural sectors, tackling crop production, productivity, and emerging challenges like climate change.
- **Simplified Approval Process:** Streamlines the Annual Action Plan (AAP) approval process by allowing states to submit a comprehensive plan rather than individual scheme-wise plans.
- One significant change in PM-RKVY is the provision that allows state governments to reallocate funds from one component to another based on their specific requirements.

Power Packed News

India rejected USCIRF's religious report

- India has recently rejected a report by the US Commission on International Religious Freedom (USCIRF), calling it biased and politically motivated.
- The Ministry of External Affairs (MEA) criticized the USCIRF for misrepresenting facts and urged the organization to focus on issues within the United States instead.

Face to Face Centres



05 October 2024

Key points from the report:

- The USCIRF alleged severe violations of religious freedom in India, including violence and legal changes affecting minorities.
- India has consistently denied visas to USCIRF members, citing interference in its internal affairs.
- The MEA denied the allegations stating that the USCIRF continues to peddle a motivated narrative about India.
- This development highlights ongoing tensions between India and the USCIRF regarding the portrayal of religious freedom in the country.

About US Commission on International Religious Freedom (USCIRF):

- The USCIRF is an independent U.S. federal agency established in 1998 to monitor global religious freedom. It assesses violations, makes policy recommendations to the U.S. government, and raises public awareness about religious persecution.
- The commission operates independently from the State Department but collaborates on related issues.



Claudia Sheinbaum: Mexico's first female president

- Claudia Sheinbaum, a 62-year-old scientist and former mayor of Mexico City, recently took office, making history as Mexico's first female president.
- Sheinbaum, who has a scientific background, has a PhD in energy engineering. Her victory is a historic turning point for Mexico, as she is the country's first female and first Jewish president.
- During the presidential election, Claudia Sheinbaum has promised that her policies will reduce crime rates in the country.
- Currently, 23 people out of 100,000 are murdered every year in Mexico. During her tenure as Mexico mayor, crime rates in the city fell by 50 percent.



UPSC (IAS)

GENERAL STUDIES

16th OCT 2024

ENGLISH MEDIUM
TIME: 8:30 AM 6:00 PM

Admission Open



MODE : OFFLINE & ONLINE

BOOK YOUR SLOT

A 12 Sector J Aliganj, Lucknow ☎ 9506256789

OTHER CENTER : CP1, Jeevan Plaza, Gomti Nagar, Lucknow ☎ 7234000501

Face to Face Centres

