1.The Genome India Project

Topic: Science and Technology

Road to Future

Aim of Genome Mapping Project

Developing therapies for diseases such as cancer and other rare ones

Predictive diagnosis and precision medicine

22 Partner organisations to be roped in

Dept of Bio-technology has initiated the project

10,000 Number of Indians whose genomic data will be catalogued in phase 1
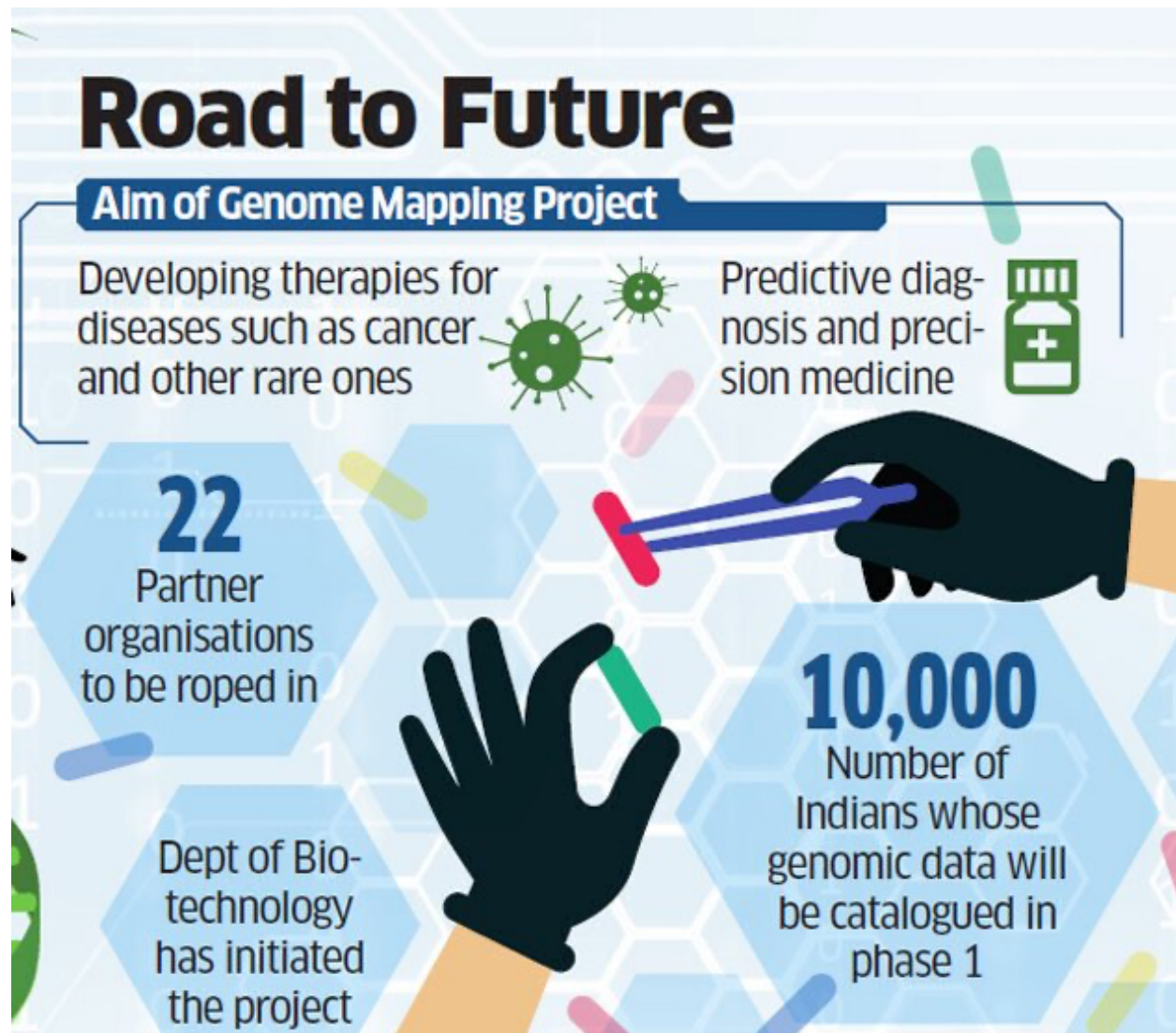
In News: About two-thirds of The Genome India Project is completed.

More on the Topic

- Through whole-genome sequencing, the plan is **to build an exhaustive catalogue of genetic variations for the Indian population.**
- This would aid in the designing of genome-wide association chips which will facilitate further large-scale genetic studies in a cost-effective manner.
- The GIP aims t**o collect 10,000 genetic samples** from citizens across India, to build a reference genome.

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- This project is led by **the Centre for Brain Research at Bengaluru-based Indian Institute of Science,** which acts as the central coordinator between a collaboration of 20 leading institutions, each collecting samples and conducting its own research.
- For conducting the project, **investigators in hospitals will lead the data collection through a simple blood test** from participants and the information will be added to biobanks.

Significance of The Genome India Project:
- The Indian population of 1.3 billion consists of over 4,600 population groups, and many of them are endogamous.
- These factors have contributed to the genetic diversity of the current population.
- Thus, the **Indian population harbours distinct variations and often many disease-causing mutations** are amplified within some of these groups.
- Therefore, findings from population-based or disease-based human genetics research from other populations of the world cannot be extrapolated to Indians.
- Creating a database of Indian genomes means that **researchers anywhere can learn about genetic variants that are unique to India's population** groups and use that to customise drugs and therapies.
- Some of the priority **areas are Precision health, Rare genetic disorders, Mutation spectrum of genetic and complex diseases** in the Indian population, Genetic Epidemiology of Multifactorial Lifestyle Diseases, and Translational Research.
- The United Kingdom, China, and the United States are among the countries that have programmes to sequence at least 1,00,000 of their genomes.
- **It is necessary to create public infrastructure such as genomic databases** – similar to what the Information Technology industry has created – for India's biotechnology sector to expand and have more valuable companies and start-ups.

Concerns of India:
- Carbon border taxes could result in **market distortion.**
- India exports about $2 billion worth of products annually to EU that would attract the CBAM levy.
- It is likely to unfairly protect EUdomestic industries from international competition – a practice known as **'green protectionism.'**
- This will be harmful to industries in India.
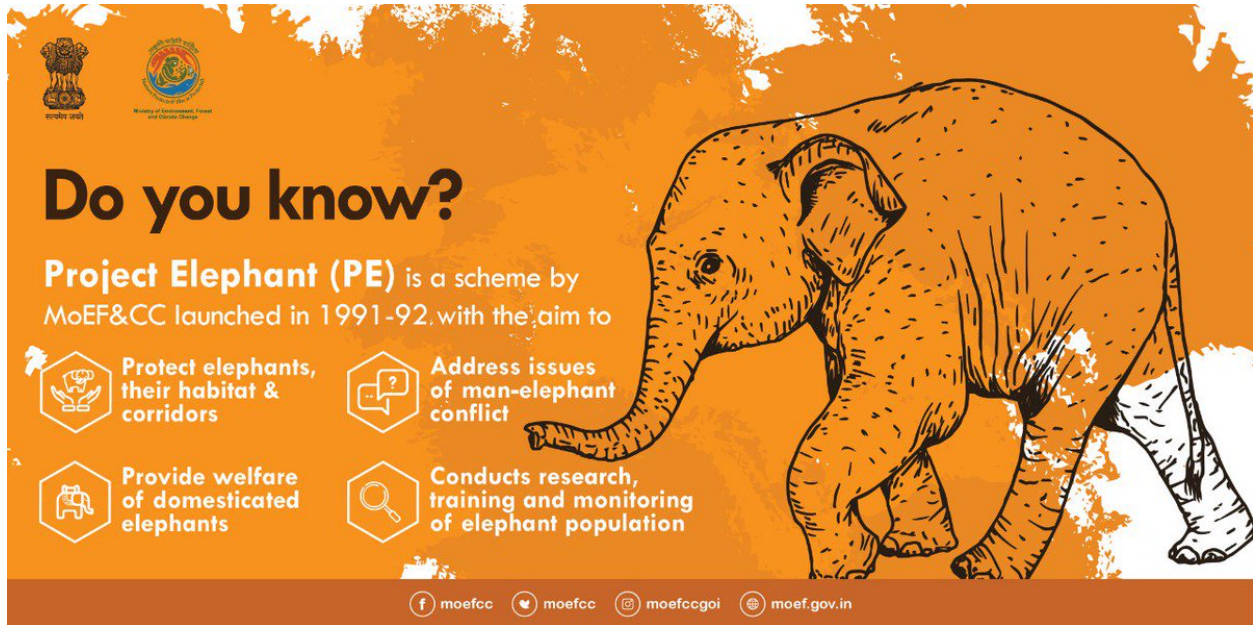
About Genome Sequencing:
- Genome sequencing is figuring out **the order of DNA nucleotides, or bases, in a genome** the order of Adenine, Cytosine, Guanines, and Thymine that make up an organism's DNA.
- Genome is the complete set of genetic information in an organism.

Source: Indian Express

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2.Project Elephant

Topic: Environment and Ecology

In News: The Project Elephant has completed 30 years.

More on the Topic:

- Project Elephant (PE) was launched by the Government of India in the year 1991-92 as a Centrally Sponsored Scheme with the following objectives:
- To protect elephants, their habitat and corridors
- To address issues of man-elephant conflict
- Welfare of domesticated elephants
- MoEF&CC provides financial and technical support to major elephant range states in country through PE.
- Presently the Project is being implemented in **22 States/UTs,** viz. Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Odisha, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal, Rajasthan, Andaman & Nicobar, Bihar, Punjab, Gujarat and Haryana (where an elephant rescue centre has been set up supported by Project Elephant).
- There are **29 notified and 1 proposed Elephant Reserve in the country** (Khasi Hills Elephant Reserve in Meghalaya).

About Elephants:

- Elephants are the largest land mammals on earth and have distinctly massive bodies, large ears, and long trunks.
- **Led by a matriarch, elephants are organized into complex social structures** of females and calves, while male elephants tend to live in isolation or in small bachelor groups.

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- A single calf is born to a female once every four to five years and after a gestation period of 22 months, the longest of any mammal.
- **Calves are cared for by the entire herd of related females.** Female calves may stay with their maternal herd for the rest of their lives, while males leave the herd as they reach puberty.
- Forest elephants' social groups differ slightly and may be comprised of only an adult female and her offspring.
- As per Elephant Census, 2017, Karnataka has highest number of elephants, followed by Assam and Kerala.

Conservation Status:

- Asian Elephant: Endangered (IUCN)
- Elephant's conservation measures in India Includes, **Monitoring Illegal Killing of Elephants (MIKE),** Development of Elephant Reserves (ER), recently Terai ER in Utter Pradesh became 33rd India's ER.

Source: Hindu

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3. National Mission On Cultural Mapping

Topic: Government Schemes

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In News: In a bid to harness the unique cultural heritage of rural India, the government has identified and documented distinctive features of more than one lakh villages across the country under 'My village my Heritage program' of the National Mission on Cultural Mapping.

More on the Topic:

- The entire exercise has been carried out under the **' Mera Gaon Meri Dharohar' (My Village My Heritage) programme** of the National Mission for Cultural Mapping (NMCM).
- The NMCM aims t**o develop a comprehensive database of art forms, artists and other resources across the country.**
- Though launched by the Culture Ministry in 2017, the programme got off to a slow start and was handed over to the Indira Gandhi National Centre for Arts (IGNCA) in 2021.
- Detailed field surveys were carried out by joint teams of the Culture Ministry and the Common Services Centres (CSC), under the Ministry of Electronics and IT (MEITY) to create the dossiers.

' Mera Gaon Meri Dharohar' (My Village My Heritage) programme:

- In this cultural asset mapping, villages have been broadly divided into seven-eight categories based on whether they are i**mportant ecologically, developmentally and scholastically,** if they produce a famous textile or product, and if they are connected to some historical or mythological events such as the Independence struggle or epics like the Mahabharata.
- Short films have been made on **750 clusters villages.** The films, which gives a 360 degree view of the village, have been shot using drones.
- The detailed dossiers on these villages as well as the films which have been shot will be made available in May on a web portal called **'The National Cultural Work Place'.**
- The web portal would contain **a virtual living museum of all villages documented.**
- There would also be a facility for uploading a village through crowd-sourcing and allowing villagers to edit and upload village data themselves.

Examples of the Categories:

- The ecological category, for example, includes **the Bishnoi village near Jodhpur in Rajasthan,** which is a case study for **living in harmony with nature,** and Uttarakhand's Raini village, which is famous for the Chipko movement.
- There are also villages which have developmental importance like **Modhera in Gujarat, which is the first solar-powered village in India.**
- The villages under the **historical category include Kandel in Madhya Pradesh, the site of the famous 'Jal Satyagraha',** and the villages of Hanol in Uttarakhand and Vidurashwathar of Karnataka, which are linked to the Mahabharata.
- **Suketi in Himachal Pradesh, Asia's oldest fossil park,** and Pandrethan in Kashmir, the village of Shaivite mystic Lal Ded, are also classified for their historical importance.

Source: Hindu

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4. United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

Topic: International Relations

In News: A High-Level Conference on Accelerating Rail Digital Transformation in Asia and Pacific region was held recently in collaboration with United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the Ministry of Railways.

More on the Topic:

- The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) is the **regional development arm of the United Nations for the Asia-Pacific region.**
- It has **53 Member States and 9 Associate Members** from Asia-Pacific Region including India.
- Established: **1947**
- Headquarters: **Bangkok,** Thailand
- **Objective:** To overcome some of the region's greatest challenges by providing results-oriented projects, technical assistance and capacity building to member States.

Source: Hindu

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5.Tropospheric Emissions Monitoring of Pollution (TEMPO) Instrument

Topic: Science and Technology

In News: Tropospheric Emissions Monitoring of Pollution (TEMPO) instrument was launched recently.
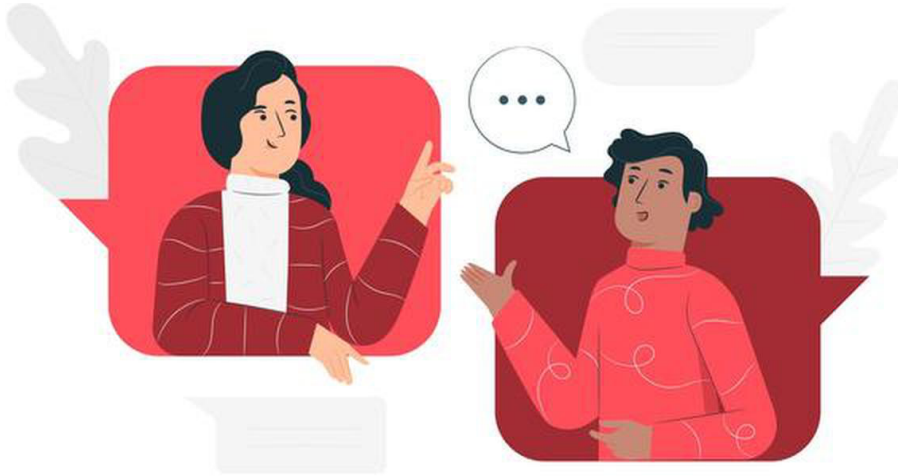
More on the Topic:

- It was **launched by NASA.**
- The Tropospheric Emissions: Monitoring of Pollution (TEMPO) instrument is on its way to a geostationary orbit where it will monitor major air pollutants across North America.
- TEMPO will take important scientific observations, including that of ozone, nitrogen oxide, sulphur dioxide and formaldehyde levels.
- TEMPO will be **the first space-based instrument that is capable of measuring air quality over North America hourly** during the daytime with a resolution of several square miles.
- The current limit is about 100 square miles, or about 258 square kilometres.
- Using TEMPO data, **scientists will be able to study rush hour pollution, the potential for improved air quality alerts, the impact of lightning on the ozone layer, the movement of pollution from forest fires and volcanoes and even the effects of fertiliser application**.
- TEMPO will join South Korea's Geostationary Environment Monitoring Spectrometer and the European Space Agency's Sentinel-4 satellite to become an air quality monitoring satellite constellation that will **track pollution across the Northern Hemisphere**.

Source: Business Standard

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6. 'The Language Friendship Bridge'

Topic: Government Schemes

In News: The Indian Council for Cultural Relations (ICCR) has envisaged a special project called 'The Language Friendship Bridge'.

More on the Topic:

- Through the project, India is planning to create a pool of experts in languages spoken in countries like Myanmar, Sri Lanka, Uzbekistan and Indonesia to facilitate better people-to-people exchanges.
- It plans to **train five to 10 people in the official languages of each of these countries**.
- The ICCR has decided on 10 languages in the first phase. They include,Kazakh, Uzbek, Bhutanese, Ghoti (spoken in Tibet), Burmese, Khmer (spoken in Cambodia), Thai, Sinhalese and Bahasa (spoken in both Indonesia and Malaysia).
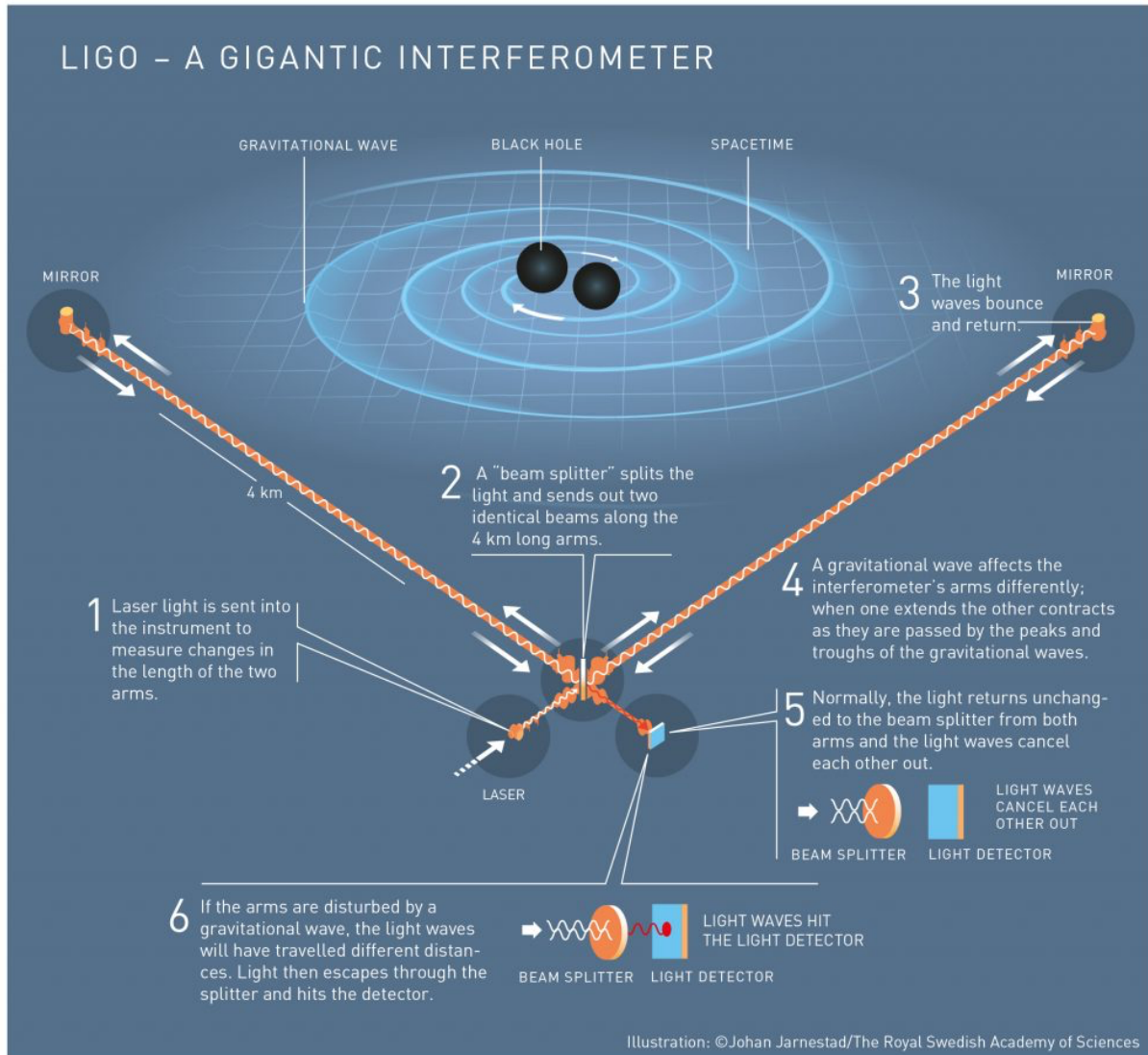
Source: Indian Express

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7. Laser Interferometer Gravitational-Wave Observatory, or LIGO, Project

Topic: Science and Technology

LIGO – A GIGANTIC INTERFEROMETER

GRAVITATIONAL WAVE   BLACK HOLE   SPACETIME

MIRROR   MIRROR

3 The light waves bounce and return.

4 km

2 A "beam splitter" splits the light and sends out two identical beams along the 4 km long arms.

1 Laser light is sent into the instrument to measure changes in the length of the two arms.

4 A gravitational wave affects the interferometer's arms differently; when one extends the other contracts as they are passed by the peaks and troughs of the gravitational waves.

5 Normally, the light returns unchanged to the beam splitter from both arms and the light waves cancel each other out.

LIGHT WAVES CANCEL EACH OTHER OUT

BEAM SPLITTER   LIGHT DETECTOR

LASER

6 If the arms are disturbed by a gravitational wave, the light waves will have travelled different distances. Light then escapes through the splitter and hits the detector.

LIGHT WAVES HIT THE LIGHT DETECTOR

BEAM SPLITTER   LIGHT DETECTOR

Illustration: ©Johan Jarnestad/The Royal Swedish Academy of Sciences

In News: The government has given the final go-ahead to India's Laser Interferometer Gravitational-Wave Observatory, or LIGO, project.

More on the Topic:

- LIGO is **an international network of laboratories that detect the ripples in spacetime** produced by the movement of large celestial objects like stars and planets.

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- These ripples were first postulated in **Albert Einstein's General Theory of Relativity** that encapsulates our current understanding of how gravitation works.
- LIGO-India will be **located in Hingoli district of Maharashtra,** about 450 km east of Mumbai, and is scheduled to begin scientific runs from 2030.
- LIGO is **crucial to demonstrating India's intent and capability to pull-off complex science projects on its own.**
- The new Ligo observatory, in combination with its partners, will let scientists probe deep questions about black holes and neutron stars.
- "The new detector will improve chances of doing science in India.

Source: Business Standard

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