



Thirty Meter Telescope Project

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Why in News

The design of **back-end instruments** and other aspects of the **Thirty Meter Telescope (TMT)** project being installed at **Maunakea in Hawaii** has been developed by close collaboration between the **2020 Physics Nobel Laureate Prof. Andrea Ghez** and **Indian astronomers**.

Key Point

- The Thirty-meter telescope (TMT) project is an international partnership between the **USA, Canada, Japan, China, and India**.
- It will allow deeper exploration into space and **observe cosmic objects** with unprecedented sensitivity.

- **Other Global Projects with Indian Collaboration:**
 - **The Laser Interferometer Gravitational-Wave Observatory (LIGO) Project**
 - The Indian scientists contributed in several aspects such as **designing algorithms for analysis of signals from gravitational waves**, estimating energy and power radiated from black holes etc.
 - Now **LIGO-India** is a planned advanced gravitational-wave observatory to be located in India as part of the worldwide network.
 - **CERN Project**
 - India became a **full Associate Member** of world's largest particle **Physics laboratory CERN** in 2017, thereby **getting full access** to data generated there.
 - The contribution of Indian scientists there is mainly in building the **Large Hadron Collider (LHC)** and construction of two significant CERN experiments, **CMS and ALICE**.
 - **Facility for Antiproton and Ion Research (FAIR)**
 - FAIR is coming up at **Darmstadt, Germany** for **studying the building blocks of matter and the evolution of the Universe**.
 - FAIR is a sophisticated **accelerator complex** that will **use the high energy and ion beams to mimic the condition inside the core** of the stars and early phase of the universe.
 - The role of Indian scientists would be to build **NUSTAR** (Nuclear Structure, Astrophysics and Reactions), **CBM** (Compressed Baryonic Matter) and **PANDA** (Antiproton Annihilation at Darmstadt).
 - **Square Kilometre Array (SKA)**
 - India has joined **nine other countries** to build the **world's largest and most sophisticated radio telescope** called Square Kilometre Array (SKA).
 - The **core of the telescope will be based in Karoo desert in South Africa**. Since the **total detection area** of the receiver dishes would exceed **1 square kilometer**, it is called Square Kilometre Array.
 - **International-Thermonuclear-Experimental-Reactor (ITER)**
 - The International-Thermonuclear-Experimental-Reactor (ITER) is focused around **creating an environment mimicking the Sun** in laboratory conditions using **nuclear fusion**.
 - India's scientists and institutions such as **Institute for Plasma Research, Ahmedabad** are playing an important role in this.

Source: PIB