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News: Major Atmospheric Cherenkov Experiment (MACE) telescope

- Recently, the Major Atmospheric Cherenkov Experiment (MACE) telescope was inaugurated in Hanle, Ladakh, representing a significant advancement in gamma-ray astronomy.

Major Atmospheric Cherenkov Experiment (MACE) telescope

- Positioned at an **altitude of approximately 4.3 kilometers**, Major Atmospheric Cherenkov Experiment (MACE) telescope is the **highest imaging Cherenkov telescope globally**, making it the largest of its kind in Asia and the second-largest worldwide.
- The MACE uses an **Imaging Atmospheric Cherenkov Telescope (IACT)** to **detect high energy gamma rays indirectly**.
- When **high-energy gamma rays enter Earth's atmosphere**, they create **electron-positron pairs**, producing Cherenkov radiation.
- MACE **captures this faint blue light (Cherenkov radiation)** with its sophisticated **equipment**.

- Its **light collector**, composed of 356 mirror panels in a honeycomb structure, **enhances stability and reflective area.**

Research Objectives

- The primary goal is to **study high-energy gamma rays from cosmic sources.**
- MACE seeks to **understand dark matter by detecting gamma rays from weakly interacting massive particles (WIMP) annihilation events** and investigating WIMPs, which may constitute much of the universe's mass.

Institution Involved

- Bhabha Atomic Research Centre (BARC)
- Indian Institute of Astrophysics

Technological Innovations

- The **telescope features a high-resolution camera with 1,088 photomultiplier tubes that detect and amplify faint signals from Cherenkov radiation.**
- Its **altitude provides a clear view above atmospheric disturbances, enhancing its observational capabilities.**