



## Indian Telescope Spots Distant Radio Galaxy

The scientists have discovered the **most distant radio galaxy ever known**, located at a distance of 12 billion light-years.

- The discovery was done after studying the data derived from a sky survey done by the **Giant Metrewave Radio Telescope (GMRT)** in Pune seven years ago.
- However, the distance of this galaxy was determined using the **Gemini North telescope** in Hawaii and the **Large Binocular Telescope** in Arizona.
- This radio galaxy belongs to a time when the **universe was only seven per cent of its current age**. This also means that the **light from this galaxy is almost 12 billion years old**.
- The unraveling of such radio galaxies at large distances is important for understanding of the formation and evolution of galaxies, and formation of primordial black holes.
- The **Centaurus A** is the closest radio galaxy at only 10 million light years away from the Earth.

### Giant Metrewave Radio Telescope

- GMRT is an array of **thirty fully steerable parabolic radio telescopes of 45 metre diameter**. It is operated by the National Centre for Radio Astrophysics of the Tata Institute of Fundamental Research.
- GMRT is an **indigenous project**. Its design is based on the **'SMART' concept** - for Stretch Mesh Attached to Rope Trusses.
- It functions at the **metre wavelength part of the radio spectrum** because **man-made radio interference is considerably lower** in this part of the spectrum in India and there are **many outstanding astrophysics problems** which are best studied at metre wavelengths.
- The location for GMRT, Pune meets several important criteria such as low man-made radio noise, availability of good communication, vicinity of industrial, educational and other infrastructure and, a geographical latitude sufficiently north of the geomagnetic equator in order to have a reasonably quiet ionosphere and yet be able to observe a good part of the southern sky as well.

### Radio Galaxy

- Radio galaxies are **very rare objects** in the universe. They are **extremely large galaxies** with a supermassive **black hole** in their centre that actively accumulates gas and dust from its surroundings.
  - **Black Hole** is a place in space where gravity pulls so much that even light can not get out. The gravity is so strong because matter has been squeezed into a tiny space. This can happen when a star is dying.
- The **accumulation of gas and dust** initiates the launch of **high-energy jet streams**, which are capable of accelerating charged particles around the supermassive black hole to almost the speed of light.
  - These jet streams are very clearly observed at radio wavelengths.
- Radio galaxies and **Quasars** (believed to be a radio galaxy viewed down the length of the jet) are some of the brightest objects in the universe.
  - The word quasar is short for "**quasi-stellar radio source**", which means star-like emitters of radio waves. However, most quasars are faint radio emitters.
  - In addition to radio waves and visible light, quasars also emit ultraviolet rays, infrared waves, X-rays, and gamma-rays.

- Most quasars are larger than our solar system.

PDF Refernece URL: <https://www.drishtias.com/printpdf/indian-telescope-spots-distant-radio-galaxy>

