RAD-BAARG – Bow and Arrow Radio Galaxy

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Why in News?

Recently, 12 Indian researchers across 3 countries have discovered a rare bow-and-arrow shaped radio galaxy, named RAD-BAARG.

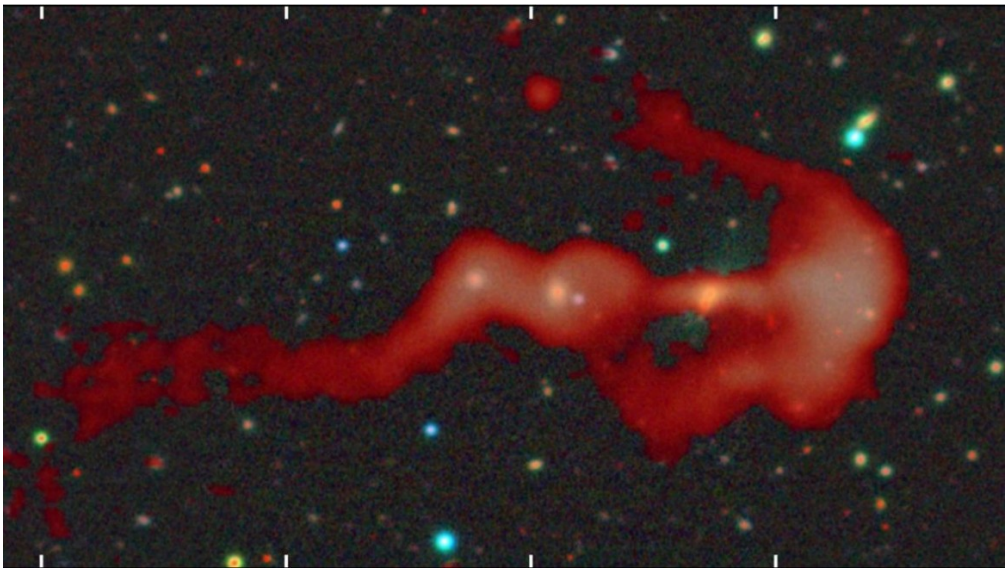
Discovery

- **Location –** About 2 billion light years from Earth.
- **Nomenclature –**
  - **RAD –** Refers to ***RAD@home Astronomy Collaboratory,***
  - India's first citizen science research platform in astronomy.
  - **BAARG –** Stands for **Bow and Arrow Radio Galaxy**.
- **Identification Method –** Identified using ultra-sensitive images from the ***LOFAR Two-metre Sky Survey*** one of the deepest radio surveys ever conducted at low frequencies.

  LOFAR Two-metre Sky Survey (LoTSS) is a giant cosmic mapmaker that takes pictures of space using radio waves instead of normal light.

  Radio galaxy *is a galaxy whose central supermassive black hole drives active galactic nuclei (AGN) to eject two oppositely directed, ultra-powerful jets of relativistic, magnetized plasma deep into intergalactic space.*

- Typical radio galaxies project symmetric, mirror-image beams, but, RAD-BAARG is heavily distorted by violent external environmental pressures.



- **Shape –** Shaped like Bow and arrow and 1.8 million light years wide.
- **Asymmetric Nature -** This radio galaxy looks very different from normal ones, with asymmetric features.
- **Environment** - Astronomers have deduced that RAD-BAARG is located within a highly active, complex multi-halo galaxy cluster environment.
- **Supersonic Infall -** The host galaxy is falling headlong toward the high-gravity center of a massive nearby galactic cluster.
- **The Sonic Boom Analogy -** As the galaxy forcefully pushing through the dense, hot intracluster medium, it travels at supersonic speeds faster than the speed of sound within that medium.
- **Illuminating the Compressed Front -** Just like a sonic boom created ahead of a supersonic aircraft, the galaxy's rapid motion creates a massive bow shock wave ahead of it.
- The relativistic plasma particles ejected from the galaxy's black hole have collided with and illuminated this compressed shock front, rendering an invisible galactic collision visible to radio telescopes.

Reference

[The Hindu | RAD-BAARG]