



# SARAS 3 Telescope and Clues to First Stars

## Why in News?

Recently, by using the [SARAS-3 Radio Telescope](#), scientists have determined the properties of a radio luminous galaxy that was formed just 200 million years after the Big Bang, a period known as the Cosmic Dawn.

- Researchers have used **data from SARAS 3 to throw light on the energy output, luminosity, and masses of the first generation of galaxies** that are bright in radio wavelengths.

## What are the Findings?

- The new information **on the period Cosmic Dawn** gave an insight into the properties of the **earliest radio loud galaxies** that are usually powered by [supermassive black holes](#).
- SARAS 3 had improved the understanding of **astrophysics of Cosmic Dawn by telling astronomers that less than 3% of the gaseous matter within early galaxies was converted** into stars, and that the earliest galaxies that were bright in radio emission were also strong in X-rays, which heated the cosmic gas in and around the early galaxies.

## What is SARAS-3 Radio Telescope?

- SARAS is a niche high-risk high-gain experimental effort of RRI (Raman Research Institute).
  - SARAS-3 was deployed over Dandiganahalli Lake and Sharavathi backwaters, located in Karnataka, in early 2020.
- SARAS aims to design, build and deploy in India a precision radio telescope to detect extremely faint radio wave signals from the depths of time, from our “Cosmic Dawn” when the first stars and galaxies formed in the early Universe.

## What are Radio Waves and Radio Telescopes?

- **Radio Waves:**
  - Radio waves have the longest wavelengths in the electromagnetic spectrum. They range from the **length of a football to larger than our planet**. Heinrich Hertz proved the existence of radio waves in the late 1880s.
  - The range of the radio spectrum is considered to be **3 kilohertz up to 300 gigahertz**.
- **Radio Telescope:**
  - Radio telescopes collect weak radio light waves, bring it to a focus, amplify it and make it available for analysis.
  - They help study naturally occurring radio light from **stars, galaxies, black holes, and other astronomical objects**.
  - These specially-designed **telescopes observe the longest wavelengths of light, ranging from 1 millimetre to over 10 metres long**. For comparison, visible light waves are only a few hundred nanometers long, and a nanometer is only 1/10,000<sup>th</sup> the thickness of a piece of paper. In fact, we don't usually refer to radio light by its wavelength, but by its frequency.

[Source: TH](#)

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