

IN SEARCH OF THE FIRST COSMIC LIGHT

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The SARAS 3 team near a lake. Special Arrangement

In a country of a billion phones, hungry for every bit of radio signal, is a group of scientists looking for spots where one can escape them.

This continuing decade-long quest, led by scientists at the Raman Research Institute (RRI), Bengaluru has taken them multiple times to Ladakh, to a place aptly named the Timbuktu Collective in Andhra Pradesh, and to lakes in northern Karnataka, with their radio telescope SARAS (Shaped Antenna Measurement of the Background Radio Spectrum), which hopes to catch the trace of an extremely elusive sign from space — that of the birth of the first stars or what's called “the cosmic dawn”.

Reverberations of the Big Bang that birthed our universe 13.8 billion years ago continue to linger in a swathe of radiation called the cosmic microwave background (CMB). At a very specific region in this spectrum, current cosmological models of the universe say, there is a point where the microwave radiation is a little dim and this, these models say, is because light from the first stars may have made hydrogen extra opaque at specific radio wavelengths.

Several groups around the world have designed custom-made, highly sensitive radio telescopes and are placing them in regions as remote as deserts in Australia to an island in the Antarctic Ocean and, if a proposal comes through, in the lunar orbit.

The EDGES (Experiment to Detect the Global Epoch of Reionization Signature) telescope, placed in an Australian desert, recorded an unusual signal that the group claims is the sign of the cosmic dawn.

However the signal's pattern wasn't shaped in the way cosmological models predicted and since 2018, when the EDGES result was published, there's a flurry of interpretation on whether the instrument actually detected the signal, and if it did, what explained its unusual structure.

To test this, the RRI group made an updated version of SARAS, called SARAS-3. Its chief distinguishing characteristic is that, unlike other radio telescopes, it can be deployed on water bodies. Water — being of uniform layers — would be an ideal medium, the group reckoned, to make such a sensitive measurement.

Following weeks of observations and months of statistical analysis by Saurabh Singh, research scientist at the RRI, SARAS 3 did not find any evidence of the signal claimed by the EDGES experiment.

Dr. Singh told *The Hindu* that the quest for the signature was still on. Following the measurements on the lake, the group is planning to revisit Ladakh and place the telescope in one of the lakes there in the hope of improving their odds of detecting the signal.

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