



HOME / SCI-TECH / SCIENCE

# RRI Bengaluru to participate in first winter Indian expedition to Arctic region

Researchers will examine the characterisation of the radio frequency environment in the Svalbard region of the Arctic

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Union Minister of Earth Sciences Kiren Rijju (2nd from left) with the team from Raman Research Institute (RRI) that will be led by Girish B.S. (2nd from right)



Characterisation of the radio frequency environment in the Svalbard region of the Arctic.



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The survey will help astronomers assess the suitability of this uniquely located region, for carrying out precision astronomy measurements.

India has its own research station, Himadri, in the Arctic region since 2008.

The RRI team was selected among the first batch of scientists, who will conduct experiments spanning across astronomy, climate change and atmospheric science in the Arctic region.

Girish B.S., from the Electronics Engineering Group at RRI, has been designated as the team leader for this batch.



Raman Research Institute (RRI) on C. V. Raman Avenue, at Sadashivanagar, in Bengaluru. The RRI team was selected among the first batch of scientists, who will conduct experiments spanning across astronomy, climate change and atmospheric science in the Arctic region. | Photo Credit: K. Murali Kumar

RRI said that he will carry out a survey of the radio frequency environment at Svalbard. Such a characterization has never been done before at the site and can potentially open avenues for deploying low frequency radio telescopes in the region.

The month-long scientific expedition is being funded by the Ministry of Earth Sciences. The National Centre for Polar and Ocean Research (NCPOR), Goa, is the nodal agency spearheading the expedition, scheduled between December 19, 2023 and January 15, 2024.

For nearly a decade now, engineers and scientists at RRI have been working on the development of Shaped Antenna measurement of the background Radio Spectrum (SARAS) series of experiments.

SARAS aims to study the faint cosmological signal from hydrogen, commonly referred to as the 21-cm signal, emerging from the Cosmic Dawn and the Epoch of Reionization.



stages of evolution several billions of years ago. These periods in cosmic history are not well understood due to lack of observations.

RRI said that since the signals emerging from this period are extremely faint and weak, their detection remains daunting. In addition, they are affected by brighter radiations emitted by several radio frequency interference (RFI) sources like cell phone towers, FM and television stations, along with the natural sources of radiation prevailing within the universe.

“Due to rampant urbanization in recent years, the space for the deployment of scientific experiments for cosmological studies is fast shrinking. Several places, where low frequency astronomical observations were conducted in the past, are no longer suitable for carrying out precision measurements. And the biggest limitation in achieving the required sensitivity is RFI,” said Mr Girish.

Sensitive electronic instruments will be used to study the incoming radio signals in the frequency range 5 – 500 megahertz (MHz) at the accessible sites in the vicinity of Himadri.

“SARAS has produced significant scientific results in the past from observations carried out in India, including remote regions of Ladakh and backwaters in western Karnataka. One of the key reasons for its success has been the access to these radio-quiet locations. The Arctic survey will inform us about the radio quietness of the location for deploying the SARAS radio telescope in Ny-Ålesund, Svalbard,” said Dr. Saurabh Singh, Associate Professor at RRI and Principal Investigator of the experiment.