



INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S. C. Mullick Road, Jadavpur, Kolkata-700 032

School of Physical Sciences

SEMINAR NOTICE

- Title** : Cosmic rays and magnetic fields in clusters of galaxies
- Speaker** : Professor Ruta Kale, National Centre for Radio Astrophysics - Tata Institute of Fundamental Research, Savitribai Phule Pune University Campus, Pune, Maharashtra, INDIA
- Date** : September 15, 2022 (Thursday)
- Time** : 15:00 hours (IST)
- Venue** : Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS

Abstract:

Astrophysical systems are laboratories that provide access to studying phenomena and their physics on scales that are not possible to achieve in conventional laboratories. In the large scale structure of the Universe, clusters of galaxies are important systems that allow probing cosmological scales to micro-physics of plasmas. Clusters of galaxies are the largest gravitationally bound systems in the Universe, having masses of the order 10^{15} solar masses. Most of their mass ($\sim 80\%$) is in dark matter, a few percent in galaxies and the remaining in the diffuse intra-cluster medium (ICM). The ICM is a hot plasma (10^8 K) that mainly contains thermal electrons that are visible in the X-rays via thermal Bremsstrahlung radiation. In addition, there are non-thermal components, namely, the magnetic fields (~ 0.1 - few micro Gauss) and cosmic rays ($CRe \sim GeV$) that mostly elude detection. The synchrotron radiation from these is detectable in radio bands and allows us to probe the properties of these components in the ICM. I will describe what radio observations, such as with the Upgraded Giant Metrewave Radio Telescope and the new generation of radio observatories, are allowing us to learn about these components.

All are cordially invited to attend the seminar.