

ICTS Seminar

Title : CHIME and FRBs

Speaker : Sriharsh Tendulkar, McGill University, Canada

Date : Wednesday, August 29, 2018

Time : 10:00 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Fast Radio Bursts (FRBs) are a newly discovered class of energetic millisecond-timescale radio transients that occur at cosmological distances (with redshifts up to $\sim 2-3$). FRBs promise to be unique probes of cosmological parameters, the baryon and magnetic field distribution in the Universe and possibly sensitive tracers of other electromagnetic or even gravitational wave transients. At the current sensitivity limit of most radio telescopes ($1 \text{ Jy-ms} = 10^{-26} \text{ erg/cm}^2/\text{Hz}$), there are about 600--1000 FRBs every day -- by far the most frequent observable astrophysical transient. Yet in the past decade we have only observed ~ 35 events, one of which is seen to repeat. With this small heterogeneous sample of FRBs, it is challenging to understand their origins. We do not know what causes FRBs, if all FRBs repeat or if there are multiple populations, and how FRBs link to other transients such as gamma ray bursts (GRBs). These questions are key to their development as a cosmological probe. Our Canadian Hydrogen Intensity Mapping Experiment Fast Radio Burst (CHIME/FRB) project at the Dominion Radio Astrophysical Observatory is designed to search a 200 square degree field of view for Fast Radio Bursts between 400–800 MHz with an expected FRB detection rate of between 1–10 FRBs/day which will lead to a large, well-understood sample of FRBs. The CHIME/FRB backend is designed to detect and characterize FRBs in real time in 1024 independent beams on the sky and disseminate detection information for further multiwavelength follow up (with optical and X-ray telescopes). I will discuss the recent progress we have made in our understanding of FRBs, the challenges in searching for FRBs, new results from CHIME/FRB during its commissioning phase and future prospects with existing and upcoming telescopes.