ICTS Astrophysics & Relativity Seminar

Title : Turbulent magnetic field amplification in weakly-collisional plasma

Speaker : Radhika Achikanath Chirakkara (University of Toronto, Canada)

Date : Friday, 09 January 2026

Time : 10:00 AM (IST)

Abstract : The intracluster medium (ICM) of galaxy clusters is an extremely hot, diffuse, and nearly collisionless plasma that hosts dynamically important magnetic fields of ~μG strength. Seed magnetic fields of much weaker strength can be present in the ICM. In collisional plasmas, which can be approximated with the magnetohydrodynamical (MHD) limit, the turbulent dynamo mechanism can amplify weak seed fields to strong dynamical levels by converting turbulent kinetic energy into magnetic energy. However, the viability of this mechanism in weakly collisional plasma is much less understood. I will discuss the properties of the weakly-collisional turbulent dynamo using three-dimensional hybrid particle-in-cell simulations with the "AHKASH" code. I will describe the properties of this dynamo in the kinematic regime for various plasma parameters. I will also discuss the features of the weakly-collisional turbulent dynamo in both the subsonic and supersonic regimes and compare them to MHD simulations.

Venue : Chern Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/91661992803?pwd=NXvDiZZlNvNtVbuaEs01ddY0fFf7ah.1
Meeting ID: 916 6199 2803
Passcode: 302010