ICTS Astrophysics and Relativity Seminar

Title : Developing a Hybrid-PIC code with FLASH to understand magnetic field growth in collision-less plasma

Speaker : Radhika Achikanath Chirakkara (Australian National University)

Date : Tuesday, 10th January 2023

Time : 15:00 PM (IST)

Abstract : A hydrodynamic approach is unsuitable to study weakly collisional and collision-less astrophysical plasma and a kinetic treatment is required to understand such plasma. In this talk, I will discuss how the hybrid particle-in-cell (PIC) code we have developed in FLASH can be used to simulate collision-less plasma and talk about computational techniques commonly used in hybrid PIC codes including the Boris algorithm, interpolation schemes, and corrections to prevent the generation of spurious parallel electric fields.

I will talk about a new method to cool turbulent collision-less plasma and show how this can be useful for a collision-less turbulent dynamo or "plasma dynamo" simulations. Our primary goal with the hybrid-kinetic approach is to understand the evolution of magnetic fields in the intracluster medium of galaxy clusters using numerical experiments and, in this talk, I will also discuss results from our plasma dynamo simulations.

Venue : Online & Chern Lecture Hall (ICTS)
Zoom link: https://icts-res-in.zoom.us/j/82485420521?pwd=QndhNW1wdUNNWlJLV3lhSUN5elFYdz09
Meeting ID: 824 8542 0521
Passcode: 101023