BOSTON UNIVERSITY

Boston University College of Arts & Sciences Center for Space Physics

2022—2023 SPACE PHYSICS SEMINAR SERIES

Magnetic reconnection and turbulence, interlinked stories approached through PIC simulations

In space plasmas, explosive and energetic events are routinely observed. Many of these events are associated with magnetic reconnection. Moreover, turbulence is undeniable present in a wide range of plasmas, e.g., solar wind, solar corona, accretion disks, etc. Magnetic reconnection and turbulence are important energy-transport and energy-transfer processes which not only transport energy across a broad range of scales but also facilitate the energy transfer between fields and particles. From in-situ observations in the Earth's magnetosheath and numerical simulations, it is well known that turbulence can lead to reconnection events. Likewise, from observations in the Earth's magnetotail, as well as simulations, turbulence might be present in almost any region of a reconnection event. Despite decades of research, there are still many open questions about turbulence and reconnection and their links in 3D. In this talk, I present results from 3D Particle-In-Cell (PIC) simulations of decaying turbulence that lead to reconnection events. I discuss the geometric and energy-transfer features associated with a reconnection event between two flux ropes. I also present partial results from 2D PIC simulations of driving turbulence on a Harris-current-sheet configuration.

Thursday, April 6th

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

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