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ICTS Astrophysics & Relativity Seminar

Title : The Conditions for the Onset of Magnetic Reconnection in an Asymmetric Current Sheet

Speaker : Subham Ghosh (Asia Pacific Center for Theoretical Physics, South Korea)

Date : Thursday, 05 February 2026

Time : 3:30 PM (IST)

Abstract : Data from various spacecraft missions reveal regions in the asymmetric magnetopause both with and without magnetic reconnection exhausts, raising questions about the onset of asymmetric magnetic reconnection. Numerical studies of reconnection generically employ perturbation to an equilibrium, where reconnection almost always occurs. However, observations say that the plasma beta controls the onset of reconnection. In fact, recent studies show that plasma beta regulates the thinning of non-equilibrium current sheets, triggering spontaneous reconnection upon reaching kinetic scales [1]. Here we extend this concept to asymmetric reconnection by considering an initially non-equilibrium asymmetric current sheet. In the presence of a driver such as the solar wind, it is shown that the plasma beta, specifically the difference in the plasma beta across the asymmetric current sheet, indeed controls the degree of pinching of the current sheet and thus controls the onset of reconnection. This idea is tested with a series of particle-in-cell simulations.

[1] Y. D. Yoon, T. E. Moore, D. E. Wendel, M. Laishram, G. S. Yun, Geophys. Res. Lett. 51, e2024GL112126 (2024)

Venue : Feynman Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/92770006772?pwd=CsCWHXwfqf0aHjBapRDHGa6W2OJxsK.1
Meeting ID: 927 7000 6772
Passcode: 050226