

ICTS Seminar

Title : Magnetic reconnection: plasmoid instability in an experimentally accessible regime.

Speaker : Pallavi Bhat, University of Leeds

Date : Friday, January 17, 2020

Time : 2:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Magnetic reconnection is a fundamental plasma physics phenomenon, relevant to laboratory, space, and astrophysical systems. It involves a rapid topological rearrangement of the magnetic field, leading to efficient magnetic energy conversion and plays an important role in solar flares, substorms in the Earth's magnetosphere, sawtooth crashes in tokamaks and particle acceleration in astrophysical jets and winds. In magnetohydrodynamic systems, plasmoid instability is a manifestation of magnetic reconnection at high Lundquist numbers. In this work, plasmoid instability in the semi-collisional regime was explored and it was shown to arise at lower experimentally accessible Lundquist numbers. Theoretical and numerical investigations were performed to validate the existence of the semi-collisional regime unstable to plasmoids in the magnetic reconnection phase space. This regime is sandwiched between the fully collisional (magnetohydrodynamic) and collisionless (or weakly collisional) regimes and is governed by theoretically predicted bounds. These bounds are validated numerically by means of simulations using a reduced gyrokinetic model.