

Seminar

Institute for Plasma Research

Title : Self Focusing and Frequency Shift of Super-Gaussian Laser Beam in a Plasma

Speaker: Dr. Lalita

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Date : 28th June 2019 (Friday)

Time : 3.30 PM.

Venue : Seminar Hall, IPR

Abstract :

High power laser propagation through plasma involves three competing processes, viz., diffraction, ionization induced refraction and relativistic self focusing. The first two cause divergence of the laser beam while the third causes convergence. The latter may overpower the former and the beam may propagate long distances well collimated or may undergo periodic focusing. In this talk, I discuss self focusing/ defocusing and frequency shift of super-Gaussian (sG) laser beam in plasma. It is found that laser beam gets defocused in tunnel ionized plasma and in inhomogeneous plasma at relativistic intensities, faster and deeper self focusing occurs. Self focusing is also better when cyclotron effects are taken into account at relativistic intensities. I have also considered the Gaussian temporal profile of laser beam with pulse of femtosecond duration and spatial profile as sG. It is found that the frequency of laser pulse is downshifted at front end of the pulse and upshifted on the rear side. I will also discuss the enhancement in the third harmonic field amplitude due to self focusing of sG laser beam in a rippled density plasma.
