Seminar

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Institute for Plasma Research

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Title: Study of laser interacting with magnetized plasma

Speaker: Ms. Ayushi Vashistha
Institute for Plasma Research, Gandhinagar

Date: 1st September 2022 (Thursday)

Time: 11:00 AM

Venue: Seminar Hall, IPR (Off-line Talk)

Join the talk online: https://meet.google.com/yda-kmcp-pyg

Abstract

Laser plasma interaction studies spawn has many areas of fundamental and applied interest. With the advent of high power, short pulse low frequency lasers (e.g. CO_2 laser) and magnetic fields of the order of Kilo Tesla in the laboratory, a new regime of laser-plasma interaction studies with magnetized electrons opens up for investigation. The thesis focuses on studying various aspects of this particular regime through PIC simulations and analytical modelling.

Some of the main observations of our study are (i) the demonstration of a new absorption scheme of laser energy wherein the energy gets directly transferred to the heavier ion species in the plasma and (ii) the identification of the underlying physics of such an absorption scheme through the process of conversion of electromagnetic energy to electrostatic fluctuation in the plasma which happens as a result of the difference between the $\vec{E} \times \vec{B}$ drifts of electron and ion species in the applied magnetic field and the oscillating electric field of the laser (iii) identification of the electrostatic disturbance as the lower hybrid wave in the plasma medium (iv) Resonance excitation of the lower hybrid wave leading to a localized absorption of the laser energy by appropriate tailoring of the plasma density profile, etc. In the talk, detailed parametric studies and observations will be discussed.