

Internal Seminar

Physics of Mesoscopic Particle Plasma

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The developments made in Laser technology in the recent years have opened up new prospects in the field of laser plasma interactions and particle acceleration. The promise of numerous applications in myriad arenas has been calling for attempts to achieve higher energies and better yields of accelerated charged particles. There are two approaches to it. While the direct approach is to raise the bar in terms of laser capabilities, the second is a more versatile option that seeks to engineer the interacting target towards a similar objective.

Energy resolved measurements conducted with femtosecond milli joule class laser had exhibited unprecedented energies and yields of electrons and x-rays. The femtosecond laser system available in TIFR-Hyderabad can attain peak intensities of 10^{15} W/cm². Previous data and simulations showed that the maximum electron temperature possible with 3.3 mJ pulses is just 50keV. But recent experiments yielded a temperature close to 1 MeV. Investigations done into various aspects of the laser plasma interaction in this setup revealed a structural modification that was taking place due to the presence of a pre-pulse in the laser. These structural modifications are being held responsible for the unexpected increment in the energy. This presentation deals with the experiments and calculations that have led to the detection and the understanding of the implications that are involved in this particular effect. In the endeavour to achieve better yields, an attempt was also made to change the wave front incident on the micro-particle. Positive outcomes to these attempts have left a door open for detailed studies and actual application in future experiments of a similar nature.

Friday, Aug 16th 2019

11:30 AM (Tea/Coffee at 11:00 AM)

Seminar Hall, TIFR-H