

# **Students' Annual Seminar**

## **Wavefront Control in Laser Plasma Interactions**

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Intense, Ultrashort laser pulses interacting with solid density plasmas produce Hard X-rays, Hot electrons and energetic ion beams (energies  $\sim 100$  keV to 1 MeV). However, many such experiments are done on sub-petawatt ( $\sim$  few 100TW) class, low repetition rates (few Hz to 10 Hz) lasers in large facilities. Scaling such experiments for high repetition rate and attaining control over the interactions involved, pose a non-trivial problem.

We use a microdroplet target (15  $\mu\text{m}$  diameter), which allows us to do high repetition rate experiments (1kHz) using sub-terawatt class lasers, while still producing high energy electrons and Hard X-rays characteristic to much higher intensities.

In this talk I will discuss the development of different methods which we pursue towards controlling the laser-microdroplet interaction. We employ an adaptive optics system to control the aberrations present in the wavefront of the incident beam and Spiral Phase Plate for changing of the transverse mode profile of the incident laser to Laguerre Gauss Mode. I will also outline the development of a pump and probe experiment and the associated diagnostics to conduct time resolved measurements on the plasma.

***Friday, Mar 23<sup>rd</sup> 2018***

***05:00 PM (Tea/Coffee at 03:30 PM)***

***Seminar Hall, TIFR-H***