

Internal Seminar

Laser driven plasma based electron acceleration, applicable mechanisms and its applications

Dipanjana Hazra

RRCAT, Indore

Experimental investigations on laser driven electron acceleration in underdense gas-jet plasma target were performed using 25 fs, 150 TW Ti: Sapphire laser system of RRCAT, Indore. Two acceleration mechanisms of recent interest, namely direct laser acceleration (DLA) and hybrid acceleration (DLA + wakefield) were identified in different experimental conditions. Results demonstrate maximum electron energy gain up to ~ 750 MeV and quasi-monoenergetic electron beams generation through DLA in mixed gas targets ($\text{He}+\text{N}_2$) were demonstrated for the first time. Further, radiography application of relativistic electron beams was explored (minimum resolution of ~ 75 μm was achieved), along with suitability for radiotherapy application. 2D PIC simulations using code EPOCH, OSIRIS and GEANT4 and theoretical analysis were performed for supporting experimental results. The studies would be of significance for developing stable laser plasma accelerator through understanding of acceleration mechanisms involved and high flux short wavelength betatron radiation source based on that.

Thursday, Jan 16th 2019

1:30 PM (Tea/Coffee at 1:00 PM)

Seminar Hall, TIFR-H