

ASET Colloquium

Catching a plasma blow hot and cold on an ultrafast timescale
by Dr. Amit Lad (DNAP, TIFR)

Friday, September 8, 2017 from 16:00 to 17:00 at AG-66

Abstract

Ultrashort (femtosecond), ultra-intense ($>10^{18}$ W/cm²) laser produced plasmas can mimic astrophysical scenarios on a table-top. The plasma is energetic and moves on femtosecond/picosecond timescales. It is also violent and turbulent making measurements difficult. Using pump-probe techniques we have been monitoring such dynamics to understand the creation and evolution of hot, dense plasmas. In this talk we will see the challenges faced, and the innovations required in these studies with several examples – rapid plasma mirror motion, movement of mega-ampere currents, propagation of shocks, etc. We will also see how to measure the lifetime of the relativistic electron bunches created by the high intensity laser.

References:

- [1] Chatterjee et al., Nature Commun. 8, 15970 (2017).
- [2] Chatterjee et al., Rev. Sci. Instrum. 85, 013505 (2014).
- [3] Mondal et al., Proc. Natl Acad. Sci. USA 109, 8011 (2012).
- [4] Mondal et al., Phys. Rev. Lett. 105, 105002 (2010).
- [5] Tata et al., Rev. Sci. Instrum. 88, 083305 (2017).