

ASET Colloquium

Femtosecond pulse propagation in water: new opportunities at longer wavelengths
by Dr. Aditya Dharmadhikari (DNAP, TIFR)

Friday, 6 January 2017 from 16:00 to 17:00
at AG-66

Femtosecond pulse propagation in a medium gives rise to spectacular nonlinear optical effects, the incident spectrally narrow ultrashort laser pulses are converted into a rainbow of light known as supercontinuum. Supercontinuum is generally observed in a transparent medium and is not yet fully explored for an absorbing medium. Another manifestation of femtosecond pulse propagation is spatio-temporal localization of optical energy resulting in bright light streaks known as filaments. The intensity reached inside a filament in water is $\sim 1 \text{ TW cm}^{-2}$, producing radicals and free electrons.

In this talk, I will discuss how the limitation imposed due to absorption bands of water can be overcome so as to observe supercontinuum using femtosecond pulses in the wavelength range 1400-1600 nm. Further, I will discuss how such intense femtosecond pulses (wavelength range 800-2200 nm) lead to lethal effects causing “nicks” or breaks in aqueous DNA that can be optically controlled.