Extreme Photonics Seminar

No. 1

Language: English

Date : April 10(Wed), 2013, 13:30 ~ 14:30

Location : Cooperation Center, 5F Meeting Room, W524
(研究交流棟5階会議室 W524)

Title : Lasing in air filaments: looking ahead

Speaker : Prof. See Leang Chin
(Laval University, Canada)

Femtosecond laser filamentation is a new branch of nonlinear optics that has attracted a lot of attention in recent years since its beginning in the mid-1990's. The temporally self-compressing pulse propagates inside the filament core as a plane wave with a constant high field because of intensity clamping. Using the femtosecond Ti-sapphire laser pulse, the extended filament zone in air could be as long as meters with a diameter of about 100 microns. The filament represents a unique interaction zone with a constant high peak intensity not found in any other optical focusing geometry. Many nonlinear optical processes could be excited in this ultrafast high intensity environment. This includes the excitation of high lying electronic states of a molecule including super-excited states. The fluorescence from either the parent molecule or the fragments exhibits gain along the filament in the form of amplified spontaneous emission (ASE). So far, this ASE type of lasing has been observed in nitrogen, carbon dioxide, water vapor and some hydrocarbons. The universality of this phenomenon is proposed.

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