香港城市大學
City University of Hong Kong

Department of Electronic Engineering

For Posting

CITY UNIVERSITY OF HONG KONG
Department of Electronic Engineering

Presents a Seminar on

Interesting Dynamics of Semiconductor Lasers

by

Prof. Jia-Ming Liu

Electrical Engineering Department,
University of California, Los Angeles

Date : 18 June 2009, Thursday
Time : 4:30 – 5:30 pm
Venue: G6302, 6/F, Green Zone, Academic Building,
City University of Hong Kong

Abstract

Besides their technological importance, semiconductor lasers are interesting dynamical systems. Multimode semiconductor lasers are well known to have complex dynamical behaviors due to mode competition under certain operating conditions. With a proper perturbation, even a single-mode semiconductor laser can exhibit highly complex dynamical characteristics ranging from stable, narrow-linewidth oscillation to broadband chaos. There are a number of approaches to invoking complex nonlinear dynamical behaviors of a single-mode semiconductor laser. The dynamical state of a given laser can be precisely controlled by properly adjusting the operational parameters of the laser. This ability to control the dynamical laser behavior, combined with the understanding of its characteristics, opens up the opportunity for a wide range of novel applications, such as bandwidth enhancement, chaotic communications, photonic microwave generation, chaotic radar, chaotic lidar, and dual-frequency radar/lidar. In this talk, I will first discuss some of the rich nonlinear dynamics of semiconductor lasers. I will then show some interesting applications that are made possible by taking advantage of the nonlinear dynamics of semiconductor lasers.

Biography

Jia-Ming Liu is Professor of Electrical Engineering at UCLA, visiting City University of Hong Kong on the Royal Society Kan Tong Po Visiting Professorship. He received the B.S. in Electrophysics from National Chiao Tung University in 1975 and became a Licensed Professional Electrical Engineer in 1977. He earned his M.S. and Ph.D. in Applied Physics from Harvard University, in 1979 and 1982, respectively. He was an Assistant Professor with the Department of Electrical and Computer Engineering, State University of New York at Buffalo from 1982 to 1983 and was a senior member of the technical staff with GTE Laboratories from 1983 to 1986. He joined the faculty of the UCLA Electrical Engineering Department in 1986. Professor Liu's research interests are in nonlinear optics, ultrafast optics, semiconductor lasers, photonic devices, optical wave propagation, nonlinear laser dynamics, chaotic communications, chaotic radar, and optical imaging. He is a fellow of the Optical Society of America, the American Physical Society, the IEEE, and the Guggenheim foundation.

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