Special Seminar

Date: Wednesday, 5/18/05

Time:
10:00 – 11:00am

521 Cory Hall (Hogan Room)
Quantum coherences in semiconductor quantum dots

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Abstract

Inversionless gain, electromagnetically induced transparency, refractive index enhancement and group-velocity reduction are predicted for semiconductor quantum-dot structures under transient conditions. Substantial deviations from atomic quantum coherence phenomena exist because of many-body effects. Specifically, the Coulomb interaction involving states of the quantum dots and surrounding quantum wells leads to collision-induced dephasing and population redistribution, as well as to many-body energy and field renormalizations that modify the magnitude, spectral shape and time dependences of quantum coherence effects. The development of the quantum-dot quantum-coherence theory and the results obtained from its application will be discussed in this talk.

Biography

Weng Chow received the Ph.D. degree in physics from the University of Arizona. His dissertation work involved fluctuation phenomena in quantum optics.

He was an Associate Professor of Physics and Astronomy at the University of New Mexico before joining Sandia National Laboratories, where he is a Distinguished Member of the Technical Staff. Weng Chow’s primary research interest is in the application of microscopic theory to semiconductor laser device development. Some of this work is described in two texts, Semiconductor-Laser Physics and Semiconductor-Laser Fundamentals: Physics of the Gain Materials. His other interests include laser gyro, phased arrays, coupled lasers, quantum optics and optical ignition of pyrotechnics.

Dr. Chow is Adjunct Professor of Optical Sciences at the University of Arizona, and Honorary Professor of Physics at Cardiff University, Wales. He is a fellow of the Optical Society of America, and recipient of the Dept of Energy, Basic Energy Science/Material Science Award and the Senior Scientist Award of the Alexander von Humboldt Foundation. Presently, he is serving as Associated Editor of IEEE Journal of Quantum Electronics.