

Introduction to a many-body description of semiconductor lasers

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Talk abstract: The incorporation of many-body effects into semiconductor-laser gain calculations has led to significant improvement in accuracy and predictive capability. This talk will start by sketching (with more pictures than equations) the formulation of a theory that is based on a systematic and consistent quantum mechanical description of a semiconductor laser medium. The physical insight gained from applying the theory will be discussed. Its accuracy and predictive capability will be demonstrated using examples ranging from microcavity lasers to wide-bandgap and quantum-dot lasers.

Speaker biography: Prof. Chow received his Ph.D. from the University of Arizona, where he worked on quantum optics problems. He is now at Sandia National Laboratories, where his primary research interest is the application of microscopic theory to semiconductor laser development. Weng also holds the position of Research Professor of Physics at Texas A&M University, has served on the CLEO semiconductor laser program committee and was an associate editor of IEEE Journal of Quantum Electronics. He is fellow of the Optical Society of America and IEEE, and recipient of the Dept of Energy, Basic Energy Science/Material Science Award, the Alexander von Humboldt Research Prize and the LEOS Distinguished Lecturer Award.