Speaker: Curtis R. Menyuk

Title: Solitons, Self-Induced Transparency, and Modelocking in Quantum Cascade Lasers

Abstract: Standard semiconductor lasers operate in a limited wavelength range, below about 4 microns. Quantum cascade lasers (QCLs) that operate in the mid-IR and far-IR have important applications to medicine, environmental sensing, and national security. While short pulse lasers (~100 fs) are available for standard semiconductor lasers, that is not the case for QCLs. Standard passive modelocking is hard to do in QCLs because of their long coherence times and short gain recovery times. We propose a fundamentally different approach, based on the self-induced-transparency (SIT) effect, that turns these weaknesses into strengths. Solitons, modelocking, and SIT are all reviewed at the beginning of the talk.