

ELECTRICAL & COMPUTER ENGINEERING SEMINAR

“High Power Tunable Optically Pumped Vertical External Cavity Semiconductor Lasers”

by

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LSC Room 213-5

Abstract & Biography

Abstract. Optically pumped semiconductor vertical-external-cavity surface-emitting laser (VECSEL) provide an innovative approach to high-power, high-brightness, compact, low-cost, frequency agile lasers engineered for specific applications in near infrared and visible range. Employing rigorous microscopic quantum design tools and low-temperature MOVPE growth technology, we demonstrate over 8.5 W output power at 1173 nm from a highly strained InGaAs/GaAs VECSEL. In addition, 50-nm of tunability in the near infrared is attained when a birefringent tuner is introduced into a high-Q cavity. Over 5-W of tunable output power in the yellow-orange spectral region from 585~589 nm is achieved by intracavity frequency doubling with a lithium triborate (LBO) type-I phase-matched crystal. This compact low-cost high-power yellow-orange laser approach provides an innovative alternative for sodium guidestar lasers (~589.1 nm), and can play an important role in many other applications in biomedicine, laser cooling, quantum computing and communications.

Biography. Dr. Murray leads the laser systems group in Arété's Longmont, CO office. His group conducts research and development on advanced laser and lidar systems for military applications. Laser systems include diode pumped solid state lasers, nonlinear frequency conversion and nonlinear optics, high power fiber laser, optically-pumped semiconductor lasers. Lidar systems include 3-dimensional lidar and lidar, and long-range lidars for target ranging and identification. Dr. Murray has extensive experience in active multi-spectral imaging, Doppler lidar, aerosol lidar, polarimetric lidar, and 3-D flash lidar. Dr. Murray has over fifteen years experience in both experimental and theoretical physical optics. He has served as the Principle Investigator on several laser and lidar/lidar programs. Dr. Murray has published over 40 papers in peer reviewed scientific journals and holds four U.S. patents. He is a member of the American Physical Society, American Institute of Physics, Optical Society of America, and International Society for Optical Engineering.

Please contact Prof. Randy Bartels, bartels@engr.colostate.edu, with any questions.