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Stable Operation of a Laser Diode with High Coherency JENNIFER E. MCFARLANE[1], JOHN G. BERTELSEN[2], Delaware Technical Community College, WAYNE N. MANRAKHAN[3], Delaware State University — High temporal coherence is required in numerous optical application such as interferometry, and holography. For laboratories with limited budgets, HeNe lasers provide excellent temporal coherency but their limited wavelengths restrict potential applications. Laser diodes are low cost, and available in multiple customizable wavelengths but their temporal coherency is adversely affected by the operating conditions. It would be of practical importance to determine which conditions offers the largest coherency. Thus the coherency of a single longitudinal mode laser diode was evaluated under different temperature and power (driving current) conditions. A simple contrast measurement of coherency was performed using a Michelson Interferometer. Our results indicate that the primary factor influencing coherency of the laser diode was temperature control. This temperature control appears to stabilize the mode structure of the laser.

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