

8th International Conference and Exhibition on

LASERS, OPTICS & PHOTONICS

November 15-17, 2017 | Las Vegas, USA

Phase noise analysis of InAs quantum-dot mode-locked semiconductor lasers

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Phase noise or linewidth of semiconductor diode lasers is vital parameter for various applications in optical sensing and coherent communication. In this talk, phase noise of individual mode in InAs quantum-dot (QD) mode-locked lasers (MLLs) made by National Research Council of Canada were investigated both theoretically and experimentally. Under optimized mode-locked conditions, the minimum linewidth of individual modes is about 0.6MHz, 0.8MHz, or 0.9MHz achieved for the repetition rate of 11GHz, 25GHz, or 34GHz respectively. For MLLs with the above channel spacing, the linewidths of 10 or more laser modes can go down to 1.0MHz at least. The relevant experimental result is consistent and fitted with the theoretical prediction which assumes zero-mean Gaussian random processes for both common mode and un-common mode phase noises. Such low phase noise MLLs will be the suitable and cost-effective candidate for multiple wavelength applications in long-haul and data-center fiber optical networks.

Biography

Jiaren Liu has completed his PhD in 1993 from Nanjing University of Science and Technology and then completed his Post-doctoral studies from Texas A&M University and University of Toronto. He is a Senior Research Officer of National Research Council of Canada and an Adjunct Professor of Concordia University. He has published 50 more papers in reputed journals and other 70 more papers in conferences and seminars.

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