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| **Author(s) Name:** | M. N. Uddin, H. Bingzhou, T. Kitano, A. Tajima, K. Kato, and K. Hamamoto | | |
| **Contact Email(s):** | drnasir@aiub.edu | | |
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| **Abstract:** |  |
| Active multimode interferometer laser diode (MMI-LD) with split pump section has been designed and evaluated to achieve enhanced 3 dB bandwidth. Higher photon density using split pump scheme and high-frequency photon-photon resonance has been exploited for the first time in MMI-LD to extend the direct modulation bandwidth. The split pump active MMI design allows interaction between the lasing mode and a second mode used as catalyst in the pumping section to achieve photon-photon resonance (PPR). Moreover, higher photon density delivered by the MMI pumping section towards the modulation section enhanced the carrier photon resonance (CPR) and the combination of those enhanced dynamics allowed us to reach more than 15.2 GHz of extended 3 dB bandwidth for the active MMI-LD. The possibility of 100 GHz direct modulation bandwidth and corresponding design parameters has also been presented in this paper. | |