

Single wavelength CW emission by using asymmetric active-MMI LD

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The low cost technologies of light source have been needed for developing of optical communication. We propose a single wavelength emission LD (Laser Diode) without any grating structure by using asymmetric 1x1 active MMI (Multi-Mode Interferometer) LD.

Figure 1 shows an active MMI LD. Two single mode waveguides are connected with MMI waveguide. In this device, optical beam propagates like Fig. 2. Therefore, the novel active MMI LD which is designed as un-center configuration leads to not only lateral phase matching but also longitudinal one. As a result, active MMI LD obtains single wavelength emission.

Figure 3 shows the typical emission spectrum of the fabricated novel asymmetric active MMI LD. As is shown here, the spectrum showed CW single wavelength emission at RT (Room Temperature) with sufficient SMSR (Side Mode Suppression Ratio) =31dB. This is the first time to obtain CW single wavelength emission by using active MMI LD by using any grating in the world. Moreover, Figure 4 shows the eye-diagram which was confirmed the fabricated devices when the modulation section was modulated by using current injection with 1.25Gbps signal (PRBS: 2⁷-1, back to back).

Reference:

- [1] Y. Hinokuma, et. al., IEICE Technical Report, OPE-116, 2010
- [2] W. Yuan, et. al., ISLC, ThC5, 2010
- [3] J. Zhao, et. al., IPRM, Tu-5.2.1, 2011
- [4] Y. Hinokuma, et. al., OECC, PDP6, 2011



Fig. 1. Schematic of asymmetric active MMI LD

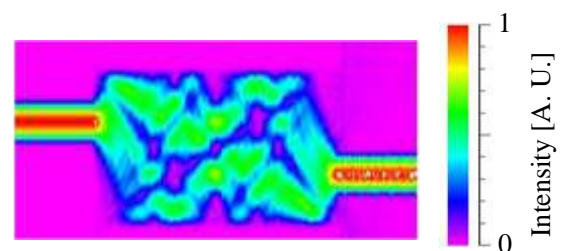


Fig. 2. Propagation of 1x1 MMI

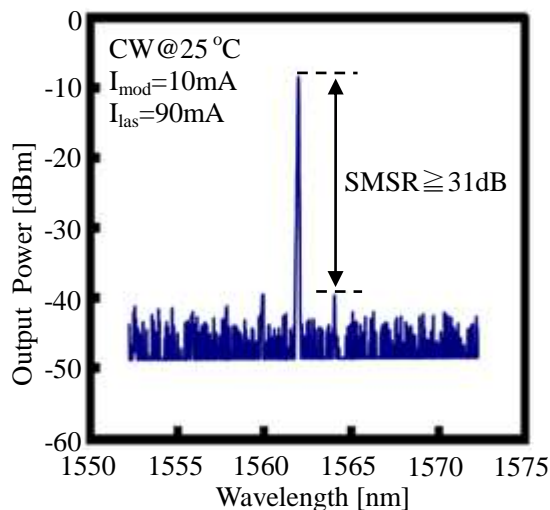


Fig. 3. Emission spectrum

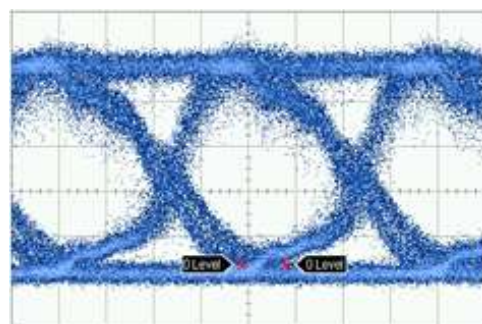


Fig. 4. Eye-diagram
(1.25Gbps, PRBS: 2⁷-1, back to back)