

Mode Selective Light Source Based on Active Multimode Interferometer Laser Diode

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Mode division multiplexing (MDM) as an approach to enhance transmission capacity of optical fibers has attracted attentions [1-3]. Mode selective light source is attractive because it may extend MDM toward short distance network including fiber to the home (FTTH) and data center because of its potential toward low cost and compact MDM light source [4].

Figure 1 shows the fabricated device structure [4]. Based on this structure, simulation of propagation paths of 0th and 1st mode by beam propagation method (BPM) [5] are shown in Fig. 2. As can be seen in the figure, 0th mode and 1st mode have individual propagation paths. The two lateral modes share common propagation area in waveguide, which is indicated as section C in Fig. 1. The two straight waveguides (section A and B) at mode selector region in Fig. 1 permit only 0th mode and 1st mode. Separated electrode pads for different sections was constructed to control the gain of each lateral mode by adjusting current injection. By controlling the gain of each lateral mode, output mode could be selected.

Table 1 shows current injection plan to obtain different lateral output modes. When all electrodes have current injection, both 0th and 1st modes could start lasing. Only 0th mode lasing condition could be obtained when only section A has no current injection. For only 1st mode lasing case, only section B has no current injection. Section C as pumping region for both 0th mode and 1st mode always has injecting current. Obtained near field pattern (NFP) results are shown in Fig. 3. Plan 1, 2 and 3 correspond to Fig.3 (a), (b) and (c), respectively. As can be seen in the figure, only 0th mode and only 1st mode lasing cases were obtained successfully.

Reference

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- [4] B. Hong, et al., OECC/PS, TuD3, 2016.
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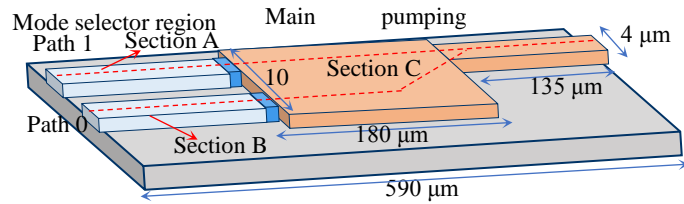


Fig. 1 Schematic view of active MMI LD

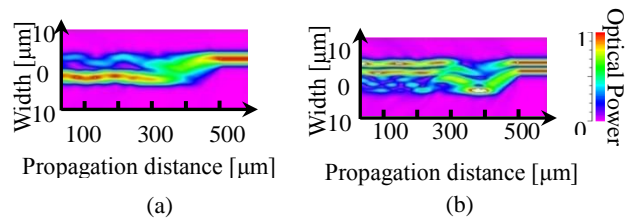


Fig. 2 Propagation path of (a) 0th mode and (b) 1st order mode

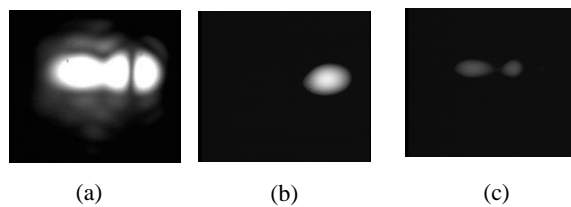


Fig. 3 NFP of (a) both modes lasing (b)0th mode (b) 1st mode

Tab. 1 Current injection plan and corresponding NFP in Fig. 3

Plan	Current C	Current B	Current A	NFP
1	Total 100 mA			(a)
2	43 mA	43 mA	0	(b)
3	100 mA	0	26 mA	(c)