

# 1.5 $\mu\text{m}$ 帯低温成長歪MQWを用いた高速多出力全光型光分離回路

1.5 $\mu\text{m}$  Multiple-Output High-Speed All-Optical Demuxer Based on LT-Grown Be-Doped Strained MQWs

NTT光エレクトロニクス研究所

○崔 佑榮、高橋亮、河村裕一、岩村英俊

NTT Optoelectronics Labs.

W.-Y. Choi, R. Takahashi, Y. Kawamura and H. Iwamura

All-optical demultiplexers are an essential part of future ultrahigh-speed OTDM networks. We have developed a new type of all-optical demultiplexer that is compact and provides simultaneous multiple-output. Our demultiplexer uses the surface-reflection optical gate based on low-temperature-grown Be-doped strained InGaAs/InAlAs MQWs [1]. The carrier lifetime in such MQWs can be reduced even to the sub-picosecond range [2], thus enabling ultrafast optical gating operation. The operating principle of our demultiplexer is shown in Fig. 1. Time-division-multiplexed N-channel signals are coupled into N different routes and appropriately delayed, creating a temporal window which encloses one signal from each channel. When the gate pulse synchronized to this window opens the gate and the reflected signals are properly coupled out, N simultaneously demultiplexed signals are produced. In order to demonstrate this scheme, an experiment was performed in which short optical pulses generated from an optical-parametric-oscillator were multiplexed to four-channel 21.3 Gbits/s signals and demultiplexed. Signals from only two channels were demultiplexed due to measurement set-up limitation. Fig. 2 is the resulting streak camera images which show two-output, 21.3 Gbits/s demultiplexing was successful. The present speed of 21.3 Gbits/s is limited by our measurement set-up and not by the gating device itself, and further improvements in demultiplexing speed are expected.

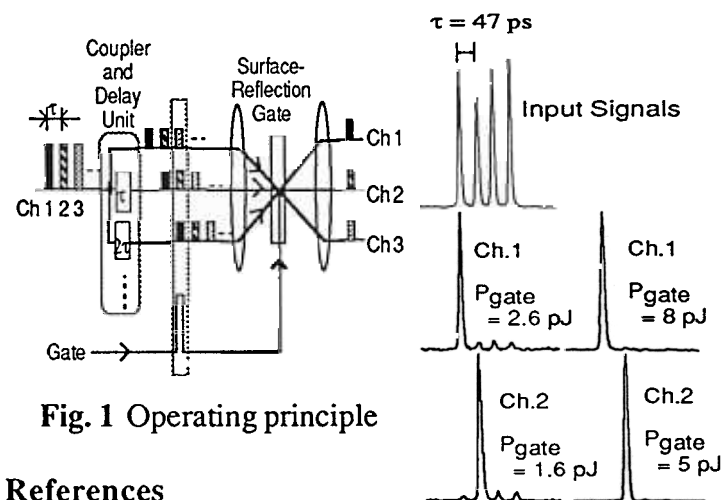


Fig. 1 Operating principle

## References

- [1] Takahashi *et al.*, ECOC'94, Vol. 4, p.113.
- [2] Takahashi *et al.*, APL 65, p.1790, 1994.

Fig. 2 Streak camera images