Integrated all-semiconductor ultra-high-speed optical gate switch

Simultaneous transmission and reception of ultra high-definition images at 160 Gbit/s data rate

We have developed a compact all-optical gate switch with a footprint less than 1 mm^2, in which an optical nonlinear waveguide using all-optical phase-modulation associated with intersubband transition in InGaAs/AlGaAs/AlAsSb coupled double quantum wells and a Michelson interferometer (MI) are monolithically integrated on an InP chip. The MI configuration allows a transverse magnetic pump light direct access to an MI arm for phase modulation while passive photonic integrated circuits serve a transverse electric signal light. We also demonstrate all-optical demultiplexing of a 160-Gb/s signal to a 40-Gb/s signal. The device is expected to be used in ultra-high-speed optical transceivers able to simultaneously send and receive ultra high-definition images.

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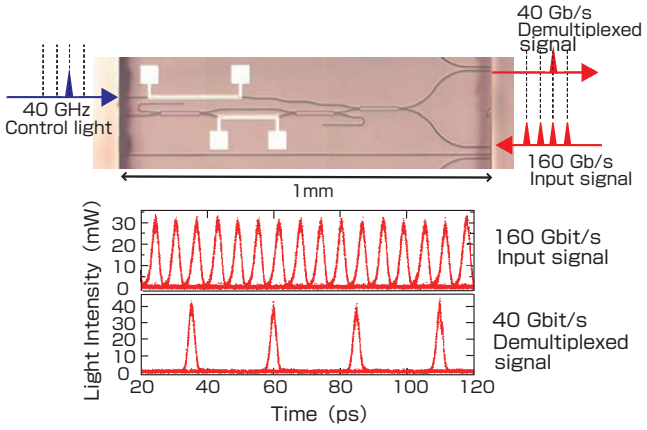

Experimental result of demultiplexing a 40 Gbit/s optical signal from a 160 Gbit/s optical input signal

A three-dimensional whole shape measurement system for processing of marine and agricultural products

High-accuracy shape measurement of marine and agricultural products paving the way to automated processing

We have developed a three-dimensional whole shape measurement system for automatic processing of marine and agricultural products in collaboration with Nikko Co., Ltd. This system is capable of measuring the three-dimensional whole shape of products of various forms, as they are carried on belt conveyors. Based on the measured shape data, the system can generate automatic processing data for cutting each product into equal-sized pieces. It can also handle various kinds of marine and agricultural products including defrosted and hence softened or frozen/distorted fish fillets with scales and pork ribs, which used to be difficult to measure with sufficient accuracy. It is expected that this system will contribute to the improvement of yield and productivity for processing marine and agricultural products.

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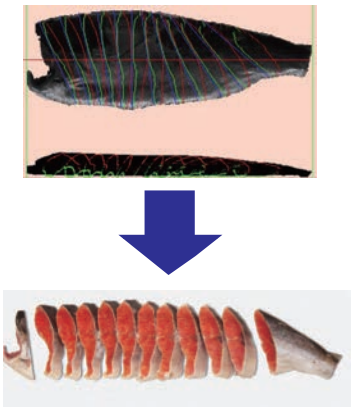
Three-dimensional whole shape measurement system



Example of measurement and cut pieces for salmon fillets