

- Integration of Photonic and Electronic Devices On a Chip -



## Motivation

Monolithic integration of photonics and electronics

- Photonics: high-speed, large-bandwidth communication
- Electronics: intelligent, large-scale integration
- Development of silicon (Si) photonics device based on Si LSI technology
- Evolution of equipment for for new-generation optical telecom network
- Ultra-small, low-power, high-performance, and low-cost.

# Originality

World-class advanced Si-photonics technology

· Si wire waveguide -highest-level transmittance -

- Ultra-small filter, Low-loss spot-size converter, Polarization diversity

#### Electronic-Photonic convergence

- High-speed VOA and modulator based on PIN structure
- Ge-PD on Si platform compatible <with Wada Lab., Univ. Tokyo>
- Monolithic device integration (Si-VOA and Ge-PD) and simultaneous operation

#### Nonlinear optical effects in silicon

- All-optical switching, Wavelength conversion, Entangled photon pair generation <with NTT BRL>

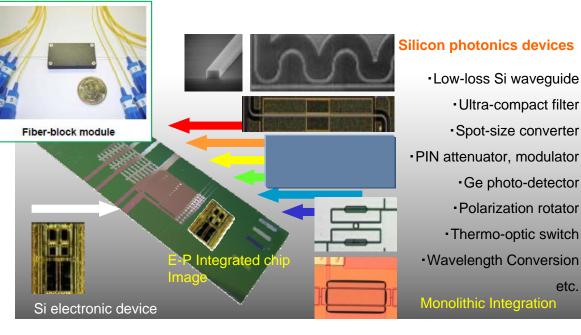
# Impact

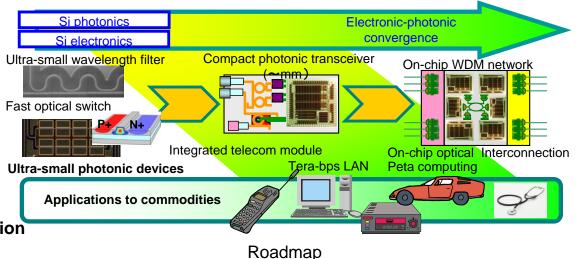
### Ubiquitous and commodity applications of ultra-fast optical networks

- High-speed data transmission between home electric appliances, Remote medical care using information technology

## Achievement of on-chip optical interconnection

- Lowering power consumption of CPU,
- High-performance parallel computing.





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