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中国のシリコンフォトリソの動向およびシリコン光変調器技術

High-speed Silicon Modulators and Silicon Photonic Researches in China

中国科学院半导体研究所¹, 儲 涛 (Tao CHU)¹Optoelectronic Research Center, Institute of Semiconductors, Chinese Academy of Sciences¹

E-mail: tchu@semi.ac.cn

Silicon photonics, as one of the hottest issues in the last decade, is widely studied all over the world. Due to the lower power consumption, lower production cost of silicon photonic devices, Chinese scientists and government also paid a lot of attentions on developing these energy saving and resource saving silicon photonic devices. Many academic groups in china focused on this term and have developed many novel devices, such as, high-speed modulators, Ge/Si photo detectors, wavelength tunable laser, micro-cavity laser, on-chip routers, AWGs and high-speed switch matrix, based on silicon photonic waveguides. Some companies also have started their work in developing prototypes of silicon photonic devices. The mass productions of silicon photonic devices is imagined to be started within several years in China, which will be the largest market of photonic devices.

In the researches of silicon photonic devices in China, the most attractive progress is the development of high-speed silicon modulators, which are the key devices determining the data transmission speed in optical network. Recently, several world fastest silicon modulators were demonstrated by our group in Institute of Semiconductors, CAS, including a 60-Gbps MZI modulator, a 60-Gbps microring resonator modulator, a 44-Gbps cascaded-microring modulator, and a 4x50-Gbps WDM modulator. These modulators were all based on silicon photonic waveguides and fabricated in commercial CMOS foundry. In developments of these silicon modulators, several kinds of optical structures and electrical designs were tested and optimized to finally realizing the high-speed modulation with satisfied efficiency and device footprint.

At conference, the researches of silicon photonics in China will be thoroughly introduced. The high-speed silicon modulators will be introduced in detail on the aspects of design, manufacturing, and measurements.

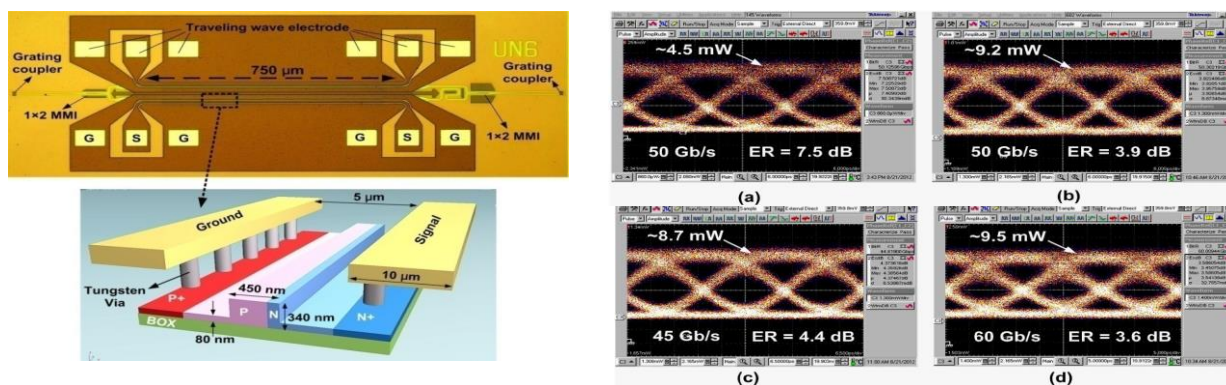


Figure. A 60Gb/s MZI silicon modulator and its testing eye-diagram.