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Title: InP-Based Integrated Optical Devices – Present and Future –

Abstract:

InP-based optical devices have been playing key roles over 30 years in the evolution of optical communication systems from the time-division-multiplexing systems in 1980's to recent digital-coherent systems. The enhanced functionalities and operation speed of the devices together with the improved electronics have brought about drastic reduction of size and power consumption of transceivers and network equipment as well as their costs. Increasing demands for network traffic have also expanded the application fields of the optical devices from the conventional telecom regions to short-reach regions such as intra-datacenter communication which now occupies 75% of the total traffic, and introduction of new technologies is strongly desired in terms of higher integration, lower power consumption and lower cost. In addition to the applications to communication networks, intensive efforts are being carried out for exploiting new applications such as sensing in near-infrared or mid-infrared wavelength region by taking advantages of the established InP-based technologies.

In this presentation, recent progress of InP-based optical devices will be reviewed mainly from the view point of the monolithic integration. Integration technologies and integrated devices will be introduced mainly focusing on the applications to digital coherent optical communication. Towards the next era, future prospects will be discussed in connection with emerging technologies such as silicon photonics and heterogeneous integration, and also some activities in sensing applications will be described.