SPECIAL ISSUE ON THE OPTICAL COMMUNICATION

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A special issue on the optical communication is published this time 10 years after the previous edition. The most important change during the 10 years for the optical fiber communication area is the development and the practical implementation of the digital coherent transmission system proposed in 2005. The optical phase synchronization of the light signal and the local light emission, the main issue for the conventional coherent transmission system, are made possible with the digital signal processing in the electrical-domain and further the chromatic dispersion and the polarization-mode dispersion of the optical fiber are made possible to compensate in the digital domain. Based on the above technical innovation, an extra high speed and a large capacity optical communication with 100 Gb/s per wavelength or 10 Tb/s per single fiber is used in practical and has already moved forward with full scale implementation. Furthermore the development of technology at 400 Gb/s or at 1 Tb/s per wavelength is proceeding and the real use of the transmission of 100 Tb/s per single fiber comes in reach.

The progress of the digital coherent transmission technology makes optical communication engineers aware of the limitation of the transmission capacity per single fiber. The research and development to push beyond the limit for the transmission capacity using the space division multiplexing technology, such as a multicore optical fiber with a plurality of cores in the fiber or a multi-mode transmission using a plurality of mode, is proceeding at satisfactory pace over the world.

After the smart phone hit the street, the traffic volume has expanded at an annual rate of 20 to 40% and it is another highlight of the recent 10 years. It is a challenging subject for the optical communication technology to follow such a rapid expanding traffic.

And also the progress of the "cloud computing technology" or the large data utilization increases the traffic in the data center drastically and grows the data center in importance, and subsequently the importance of the bandwidth expansion of the interconnection between a CPU and a memory and between the devices, and the power consumption are gaining prominent attention.

The optical interconnection with the broadband performance and the low power consumption are receiving remarkable attention in solving these subjects and also are considered more important as a new application area in the optical communication.

In order for Furukawa Electric to follow a new stream of the optical communication technology, we have been aggressively making a progress on the development of the following items.

1) An optical device technology for the digital coherent transmission.
2) The optical fiber and the optical connecting technology for the space division multiplexing transmission.
3) The optical interconnection related technology.
4) The common fundamental technology supported on the above items

The special issue is introducing the result on the progress in the above items. We expect that the result encourages the innovation of the optical communication.

We would like to ask for your continuous support from now on.

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