

Proposal of Channel Enhancement by using Novel Advanced OAM Mode for Transmission on N-core MCF

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Towards transmission capacity increase of the optical fiber, although the study of spatial multiplexing method by the multi-core fiber (MCF) has been actively, in order to increase transmission capacity, we set the smaller basic moment angle than OAM (Orbital Angular Momentum) Mode, and call advanced OAM mode. There is a possibility that you can set the number of channels more than the number of cores by MCF transmission using the advanced OAM mode. Figure 1 show the advanced OAM mode on the six-core MCF. Considered to be multiplexing and demultiplexing by phase device each mode of the advanced OAM at the input and output ends of the MCF, we have studied regarding phase device.

One of the important issue of mode demultiplexing is crosstalk. Figure 2 shows the relationship between the maximum number of charges and crosstalk in the six core MCF. Given the fact that the signal mode crosstalk -4dB by MIMO technology is guaranteed, the maximum charge number on the available theory is 5, it is possible to 11 channel transmission at this time. This is equivalent to approximately two times the number of cores, for further transmission channel number increases, improvement in crosstalk is essential. In general, regarding array waveguide number of the AWG used in the wavelength division multiplexing, although it is about 100 pieces, array waveguide number in the transmission system that we propose is limited to the number of cores N. When array waveguide is less and the like six, output lights should be originally output the waveguide would have been output, but the lights leaks to the other output waveguide. It is thought to be a lack of phase information due to the number of array waveguide is small. We are considering that this problem is to add the phase information by the phase control as a solution, artificially increasing the number of array waveguide.

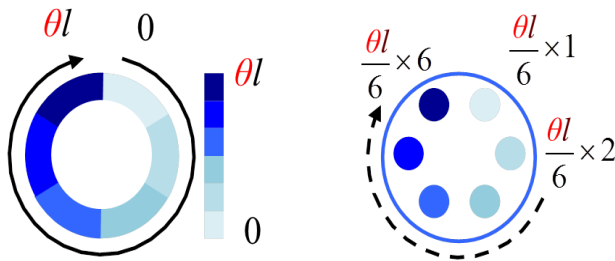


Figure 1 Advanced OAM mode on the six-core MCF

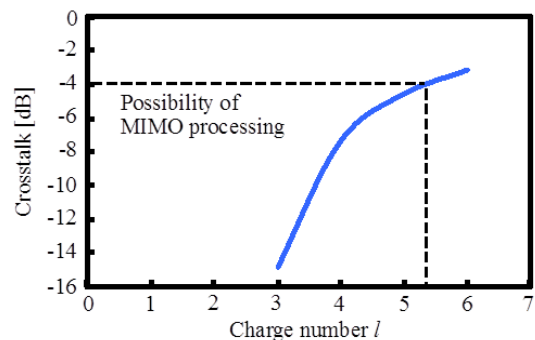


Figure 2 Relationship between the maximum number of charges and crosstalk in the six core MCF

Reference

[1] H. Hokazono, et.al, APC, 2014, JT3A.18.

[2] R. Tanaka, et.al, OPE, 2014, 225, pp. 127-132