

INOUE Laboratory

Graduate School of Engineering

Division of Electrical, Electronics, and Information Engineering

Subject

We study advanced optical communication systems and quantum communication systems utilizing quantum mechanical properties of light.

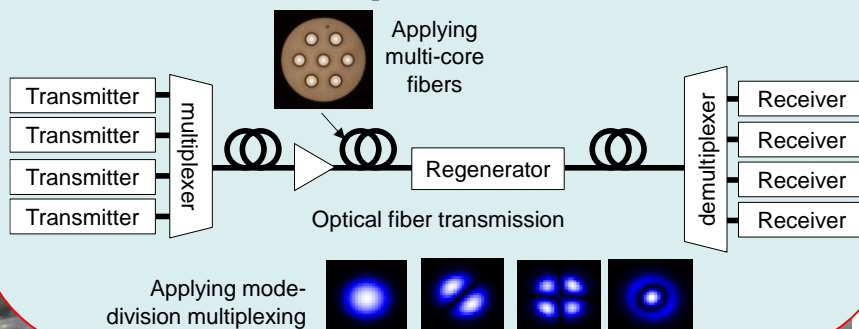
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(Research A) Optical fiber transmission

Information infrastructure such as the internet is supported by optical communication systems enabling large-capacity and long-haul signal transmissions.

- The transmission capacity can be increased by signal multiplexing techniques that simultaneously transmit multiple optical signals over a single-fiber. We are studying ultimate-dense wavelength-division multiplexing and space-division multiplexing techniques.
- The optical signal quality is degraded due to noises superimposed during the transmission, which restricts the transmission performance. In order to overcome this problem, we are studying optical signal regeneration and forward error correction techniques.



(Research B) Quantum cryptography

In the present information society, information security is a crucial issue. We are studying secure communication systems called *quantum* crypto systems, which guarantee ultimate security based on quantum mechanical properties of light.

The utilized quantum mechanical properties are; particle-like and wave-like properties of light, quantum mechanical superposition states, and the uncertainty principle. The systems find eavesdropping from state change due to observation by an eavesdropper.

