Faculty of Science and Technology
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Optical Fiber Transmission System

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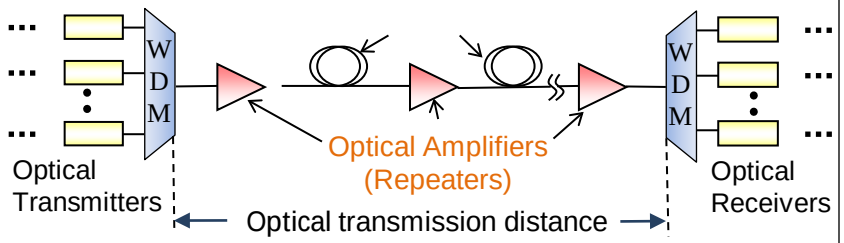
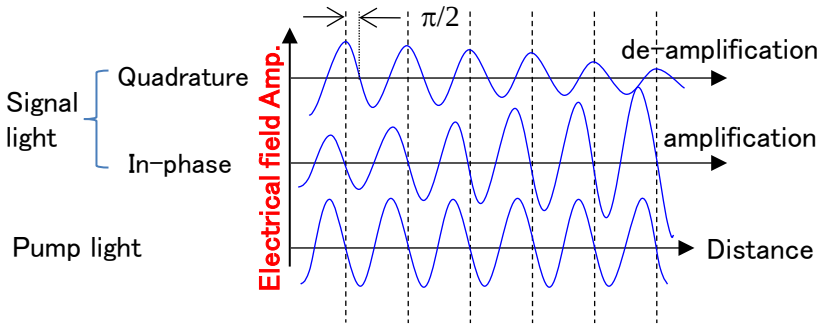
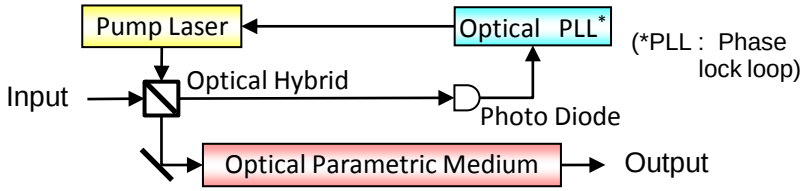


Fig.1 Configuration of backbone optical fiber transmission system



(a) Fundamental operation of PSA



(b) Basic configuration of PSA

Fig. 2 Optical parametric phase sensitive amplifier (PSA)

Content:

The performance of communication network has been drastically enhanced by adopting fiber-optic transmission technologies into the backbone networks and access networks. Recently, the demand for communication capacity is increasing even more, because of popularization of cloud type-application and transportation of ultra-broadband contents such as high-definition moving pictures. The purpose of our laboratory is bringing a significant progress of communication network by introduce novel functionality into the optical communication network.

One of our topics of research is expanding optical transmission distance - capacity in backbone networks (Fig.1) by introducing phase-sensitive optical amplifiers (PSA) (Fig.2) as optical amplifier repeaters. PSAs amplify in-phase and de-amplify quadrature component with reference to phase-locked pump light in parametric amplifiers. Significant extension of optical transmission distance is expected by numerical simulation on transmission system. We have also successfully demonstrated the principles of PSA functionality.

Keywords: optical communication,
optical fiber, optical amplifier
optical signal processing

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