Orthogonally Polarized Light as Selectable Wavelengths

A phase-correlated, orthogonally-polarized, light-stream generator (POLG) apparatus

Georgia Tech students have developed a phase-correlated, orthogonally-polarized, light-stream generator (POLG) apparatus, that is central to a dual-polarization, self-heterodyne detection scheme and used in an optical communication system with a demodulation scheme. In this technique, the signal light and reference light in orthogonal modes of polarization that have different wavelengths are derived from the same laser source. The random phase fluctuation between the signal and reference lights can be avoided completely by using the POLG apparatus whose utility can be extended to other communication systems and configurations.

Summary Bullets

- Future UDWDM-PON application
- Simplified ONU
- Low power dissipation ONU

Solution Advantages

- Future UDWDM-PON application
- Simplified ONU
- Low power dissipation ONU
- Central office control
- Low cost ONU
- High spectral efficiency
- Radio-over-fiber
- Self heterodyne generation of millimeter wave data

Potential Commercial Applications

- Ultra Dense Wavelength Division Multiplexing Passive Optical Networks (UDWDM-PON)
- High transmission capacity with enhanced spectral efficiency

Background and More Information

As wireless and optical-wireless communication networks enter the fifth generation (5G), dual-polarization (DP), coherent optical communication schemes are expected to play a critical role in core networks and deep wavelength division multiplexing (DWDM) passive optical networks (PON) to increase spectral and power efficiency. Traditionally, coherent optical detection is accomplished by using an optical local oscillator in the form of a CW laser light source that has a very narrow optical spectrum to minimize phase noise. When combined with the data baring light stream on a photo-detector (PD), the coded signal is retrieved with the nonlinear response of the photo-detector to the incident electric fields. PON architecture requires robust delivery at the customer optical network unit (ONU), making adjustments and therefore the use of local optical oscillators impossible.

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