FIBER SENSORS

FIBER SENSORIC

Optical fiber can be used for the interference-free transmission of measurement signals, it can act directly as a sensor.

Measurements can be carried out under adverse conditions e.g. electrical and magnetic fields or sparking environment.

Hybrid integrated read out units based on PolyBoard technology offers cost-effective solutions.

Rapid precision sensing

Optical fiber opens up more and more possibilities for measuring physical quantities. This can be realized with two methods of rapid precision sensing (RPS):

Correlation RPS: Measurement of fiber length. Directly-modulated external cavity DBR laser with integrated optical isolator and on-chip detection (10G photodiodes).

Coherent RPS: Localized measurements of fibers. Analysis of fiber stress or temperature based on coherent detection as phase and runtime of backscattered signals.
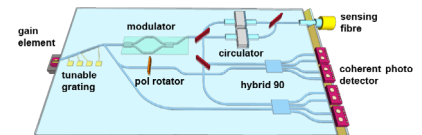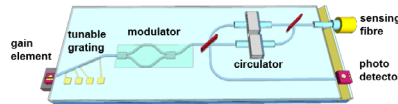
Technical Informations

- On chip detection (10 G diodes)
- DBR laser with integrated optical isolators

Applications

- Precise measurement of the fiber length
- Measurement of temperature and expansion - localization of fires

APPLICATIONS

Correlations-RPS

Problem:
The realization of higher bandwidths in the new 5G mobile communications standard requires phase-controlled parallel data streams. Conventional technologies currently in use cannot achieve this.

Solution:
Using the RPS method, it is possible to measure the transit time of the light in the optical fiber with sufficient accuracy. This is the basis for phase adjustment of the data in the direction of the mobile phone antenna.

PON Monitoring

- Topology awareness
- Intelligent localization
- Map navigation
- Direct information from physical fiber plant

Further Applicatios

- Exact measurement of fiber length
- Tools: Wear measurement, material stress
- Buildings: Measurement of temperature and strain, localization of fires
- 5G mobile communications

Coherent-RPS

Problem:
With optical reflectometers, it is not possible to directly localize environmental influences along an optical fibre.

Solution:
The coherent RPS method enables a phase analysis of backscattered signals in addition to the time domain measurement. Temperature changes, mechanical stress, vibrations etc. can be detected with local assignment.

Further applications:

- **Telecom Networks:** Mechanical digging, Fiber condition detection, Cable tampering
- **Power utilities:** EMC-free surveillance, Copper theft, Trespassing
- *Water/Oil & Pipeline detection*: Leak detection, Intrusion/security, Pig tracking, Hot tap/Valve detection
- **Intrusion & security:** Perimeter security, Activity detection, Tunneling, Hydrogen surveillance
- **Geo-technics:** Seismic, Rock Fall, Land Slide, Flooding
- **Smart Cities & Traffic monitoring:** Traffic / journey times, Speed monitoring, Vehicle counts, Accident detection/avoidance

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