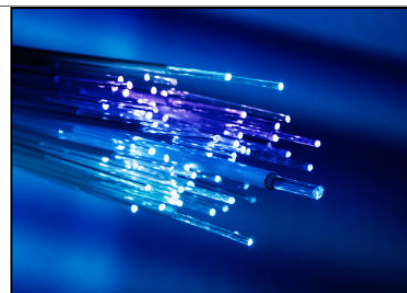


SC14 | Optical fibers sensors: principle, technology and applications for structure monitoring



Nouvelle formation

NIVEAU : DÉBUTANT

Publics : Engineers, technicians, users or project managers wishing to know more about these new instrumentation technologies, in particular optical sensor networks with innovative features.

Prérequis : Basic knowledge or knowledge in instrumentation, even a practice in measurement, and ideally some notions of optics

Responsable(s) pédagogique(s) : Pierre Ferdinand - Consultant expert

Langue de la formation : Français

Capacité maximum : 12

Prix : 1100€ HT - **Durée :** 2 days - 14 h

Objectifs

- ▶ Become aware of these new optical fibers sensing technologies
- ▶ Better understand the benefits, specificities and performance
- ▶ Have knowledge to exchange, propose, implement these technologies

Prochaines sessions

- ▶ 06 mai 2019 au 07 mai 2019 - Palaiseau

Thèmes abordés

Optical fibers

- ▶ Reminders about the main characteristics
- ▶ Specificities for the field of sensors

Optical fibers sensors

- ▶ Different types of sensing, principles of operation, advantages, configurations, specificities...

Optical fibers sensor networks

- ▶ Distributed sensors (Bragg networks, etc.)
- ▶ Remote sensors (retrodiffusion, Rayleigh, Raman and Brillouin phenomena)
- ▶ Performance
- ▶ Advantages

Industrial applications

SC14 | Optical fibers sensors: principle, technology and applications for structure monitoring

Le programme

Optical fiber

- ▶ Reminder of the metrological terms required to characterize a sensor - User Assessment Criteria
- ▶ What is a fiber, different types, markets
- ▶ Main characteristics (attenuation, dispersion, conservation of polarization...) and performance
- ▶ Manufacturing methods
- ▶ Special sensor fibers; "All-fiber" components (coupler, polarizer...); Connections

Optical Fibers Sensors

- ▶ A short history of the field of OFS
- ▶ The paradox underlying the different modes of use of fibers
- ▶ Components of an OFS, their benefits; What types of sensing by OFS
- ▶ Detailed examples of the different modes of interaction
- ▶ Different types of light modulation

Optical Fibers Sensors Networks and Distributed Sensors

- ▶ Two large families of OFSN (OFS networks distributed vs. remote)
- ▶ OFS with Bragg gratings (principle, photo-inscription, characteristics, sensitivity...)
- ▶ Bragg transducer sensors and measurement / demultiplexing systems for fiber sensors+B120 with Bragg gratings
- ▶ Detailed examples of applications (Civil Engineering, public works, petroleum sector, various fields of use of composite materials, Railway...)

Optical Fibers Sensors Networks of distributed type

- ▶ Distributed OFSN and the underlying philosophy
- ▶ Principle of measurement points multiplexing
- ▶ Elastic / inelastic scattering phenomena in the fiber (Rayleigh, Raman and Brillouin)
- ▶ Principles of Raman measurement instruments, performance
- ▶ Detailed examples of applications in works monitoring
- ▶ Principles of Brillouin measurement instruments, performance
- ▶ Continuously sensitive measurement cables
- ▶ Examples of infrastructure monitoring applications

Assessment

Méthodologie et évaluation

Tutorials and exercises