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SEMINAR:

Distributed Polarization Sensitive Reflectometry in Single Mode Fibers

Speaker: Prof. Andrea Galtarossa
(University of Padova, Italy)

Date: 29 November 2012 @ 11:00 AM

Location: Room A223 – Polo Scientifico F. Ferrari - Povo

Note: The seminar will be held in English

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Optical fiber communications were in their early infancy, when in 1972 F. P. Kapron, N. F. Borrelli and D. B. Keck reported the first analysis of birefringence in single-mode fibers, attributing the observed polarization effects to “very small core ellipticities and stresses”. In 1978, S. C. Rashleigh and R. Ulrich recognized that this birefringence causes a polarization mode dispersion, which “would limit the (bandwidth x length) product of the fiber”. Since then, the research activity on polarization effects in single-mode optical fibers has flourished, touching all the facets of the topic, while discovering new ones. Measurement techniques have been developed as an integral part of this evolution; in this respect, A. J. Rogers posed a milestone in 1980, when he proposed a polarization sensitive version of optical time domain reflectometry as a tool to investigate the local polarization properties of fibers. Several Authors have since then contributed to the improvement of polarization sensitive reflectometry (PSR).

In the talk the most recent achievements about distributed characterization of polarization properties in single-mode fiber are reviewed, with emphasis on polarization mode dispersion (PMD) and birefringence measurements. Furthermore, the presentation addresses also the geometric effects of polarization that arise when the fiber is bent and/or twisted. Finally, applications of birefringence measurements for sensing applications will be described.

• About the Speaker

Andrea Galtarossa received the degree in Electronic Engineering from the University of Padova in 1984. After the military service, he was a recipient of a one-year fellowship by Telettra S.p.A. to work on the design of multilayer dielectric filters for WDM devices. In 1986 he joined SAIFO, a new company founded by some SME's involved in telecommunication systems to support the diffusion of optical technologies and to organize a research and teaching laboratory. Afterward, he joined the Department of Information Engineering (DEI), University of Padova, as assistant professor in Electromagnetic Fields (1990), associate professor in Microwave (1998) and full professor in Electromagnetic Fields (2006).

His research activity is dedicated to propagation effects in optical devices, in particular single-mode optical fibers. Mainly, the research is carried out by means of analytical and numerical methods followed, whenever possible, by experimental validations. Presently, he is the scientific coordinator of the following activities:

- agreement between DEI and the Higher Institute for ICT (ISCOM, Rome, Italy), dedicated to research in transmission systems operating at 10 Gbit/s e 40 Gbit/s for single-channel and WDM systems.
- Cariparo Foundation Project (2009-2013) titled “Innovative integrated Systems for Monitoring and assessment of high risk LANDslides” (SMILAND).
- University of Padova project (2011-2013) “Near Infrared Nonlinear Fiber Oscillator” (NINFO).
- Bilateral project Italy-South Africa (2011-2013), between DEI and Nelson Mandela Metropolitan University (NMMU, Port Elizabeth) titled “Polarization effects in next generation high capacity optical fiber systems”.

He has been a member of the Technical Program Committee of European Conference on Optical Communication (ECOC) in 2007, 2008, 2009, 2011; he has been Technical Program Co-Chair for ECOC 2010 and Guest Editor of IEEE/OSA special issue of Journal of Lightwave Technology on “Polarization Effects in Fiber-Optic Networks” (July 2006).

He has authored or co-authored more than 140 regular and invited papers on international peer-review journals and in the proceedings of international conferences.

He is the inventor (or one of the inventors) of 5 international patents. He is also co-editor of the book “Polarization Mode Dispersion”, Springer, 2005.