Contribution of QUasI-constant Enveloppe mulTicarrier waveforms to optical communications

Project acronym: QUIET

Research lab: Lab-STICC, UMR CNRS 6285
Teams: Architectures et Systèmes opto-Microondes et Photoniques (ASMP) & Propagation et Interaction Multi-échelle (PIM)

Thesis directors: Azou Stéphane (ENIB, ASMP) and Tanguy Noël (UBO, PIM)
Co-advisor : Vincent Choqueuse (ENIB, ASMP)

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Résumé du projet de thèse :
This thesis project aims to improve the performance of fiber optic systems, which is recognized as a key technology to meet the massive demand for capacity while addressing environmental imperatives. The increase in throughput tends to make signals sensitive to imperfections in the transmitting/receiving devices as well as to the effects of the transmission channel. The transmitted waveforms and the signal processing algorithms need to be improved to compensate or avoid these distortions and thus satisfy the required quality of service.
The originality of this thesis topic is to contribute to the reduction of the imperfections of the optical physical layer by using multicarrier waveforms with low envelope variation by construction, thus being able to limit the processing required for the compensation of the non-linear distortions, in view of a better energy efficiency. An opening towards artificial intelligence is planned with the automatic learning of multicarrier waveforms for optical access.
The subject is multidisciplinary in nature, being positioned at the crossroads of two fields: photonics and digital communications.
An experimental validation of the theoretical results is planned in the framework of the CPER PhotBreizh.

Keywords: Photonics, Optical fiber, Optical communication, Multicarrier modulations, Digital Signal processing, Artificial Intelligence, Hardware impairments compensation, Semiconductor Optical Amplifier, Experimental study.

Diploma and skills required:
Master's degree (or equivalent) in signal processing, telecommunications or photonics.
Strong experience in signal processing, digital communications, telecommunications or optoelectronics.
Good programming skills in general and knowledge of Matlab or Python in particular are desired.

Application Details and Contact Information:
The application should include a CV, cover letter, academic transcripts, and letters of recommendation.
Please note that as part of the selection process, shortlisted candidates will be invited for an interview shortly after the deadline.

Address all applications to:
Prof. Stéphane Azou
Email: azou@enib.fr
National Engineering School of Brest, France

Apply before April 30, 2023