

Spécialité de Master « Optique, Matière, Paris »

Stage de recherche (4 mois minimum, à partir de début mars)

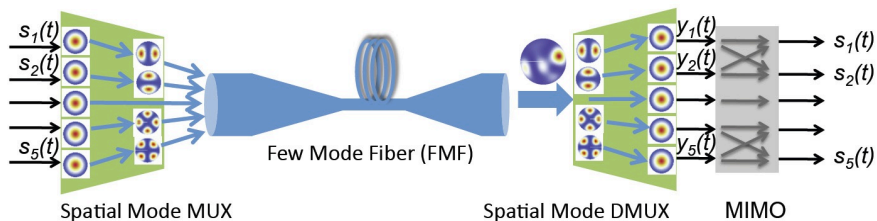
Proposition de stage (**ne pas dépasser 1 page**)

Date de la proposition : 16 Nov. 2015

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Lieu du stage / internship place:	Palaiseau (France)		

Titre du stage / internship title: **Manipulating the optical coherence of spatial-division-multiplexed signals in multimode fiber transmission systems**

Résumé / summary
 Our project is focused on the **potentialities offered by the spatial-division multiplexing (SDM) in multimode optical fibers**. As illustrated in the Figure, optical data signals are carried by a multitude of spatial modes of the fiber. Whereas each mode can be seen as one individual space channel, transmission impairments are caused by unavoidable cross-talk between the spatial modes. A MIMO (Multiple Input Multiple Output) digital signal processing is then required to recover the input data.



Our objective is to study a novel approach for the processing of the transmitted optical data, in order to simplify the digital signal processing scheme whose complexity scales with the square of the space channel numbers!

We intend to directly manipulate the optical coherence properties of the transmitted beam in order to strengthen the information content for each spatial mode, enabling a performance improvement of the transmission. In the past, two-wave mixing schemes have shown their capabilities in enhancing, or even extracting, temporal data channels carried by a collection of spatial modes. Based on these tools, we plan to realize full self-organizing systems able to automatically separate the data channels. These self-organizing systems share many features in common with the self-organizing laser cavities we previously developed in which the cavity automatically selects one coherent mode from a series of spatial and spectral modes.

Following a first experimental demonstration of these principles, we plan to demonstrate that a non-linear optical processor can efficiently separate data channels being carried by a set of coupled spatial modes.

This project, which intends to address the issue of communication system capacities, will be conducted in collaboration with Telecom Sud-Paris and Alcatel Lucent Bell Labs (France).

Toutes les rubriques ci-dessous doivent obligatoirement être remplies

Ce stage pourra-t-il se prolonger en thèse ? Possibility of a PhD ? : YES			
Si oui, financement de thèse envisagé/ financial support for the PhD: CIFRE or Doctoral School EDOM			
Lumière, Matière, Interactions	X	Lasers, Optique, Matière	X

Fiche à transmettre (fichier pdf **obligatoirement**) sur le site <http://stages.master-omp.fr>