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*Light dynamics in nonlinear twisted multicore fibers.* Preliminary report.

Novel photonic structures such as multi-core fibers are all optical platforms to study novel spatio-temporal dynamics. Phenomena such as discrete soliton formation, light localization, bifurcation phenomena and phase transitions can be studied in state of the art photonic systems.

This work presents some of the dynamical features mentioned below in a configuration of fiber arrays having a mechanical twist and presenting loss/gain properties in a (P)arity (T)ime configuration [1]. For finite arrays we present studies on existence and stability of nonlinear modes. For large systems, we will implement a statistical mechanics approach to determine whether localized coherent modes form.

This work [2] is in collaboration with Claudia Castro-Castro (Southern Methodist University), Yannan Shen (California State Northridge), Gowri Srinivasan (Los Alamos National Laboratory) and Panayotis Kevrekidis (University of Massachusetts, Amherst).

References:

[1] S. Longhi, "PT-phase control in circular multicore fibers" *Optics letters* 41(9). 1897-1900, (2016).

[2] C. Castro-Castro, Y. Shen, G. Srinivasan, A. B. Aceves and P. Kevrekidis, "Light dynamics in nonlinear trimers and twisted multicore fibers", submitted to *Journal of Nonlinear Optical Physics and Materials*, (2017). (Received January 16, 2017)