Open post doc position in nonlinear fiber optics in passive resonators

University: Lille, France
Contact : Arnaud Mussot
06. 63.25 56 66, E-mail : arnaud.mussot@univ-lille.fr
Duration : 24 months

This post doc will be held in the nonlinear optics group of the PHLAM laboratory in Lille (France). This group is specialized in cutting-edge fiber optics design, fabrication (*http://fibertech.univ-lille.fr*) for nonlinear fiber optics investigations (see results recently obtained in the field [1-3]). The lab is one of the best equipped in the world with many top level equipment (a few high band pass oscillo-70 GHz, a time lens system, an optical sampling oscillo, many lasers fs, ps, ns, FROG systems…) and the possibility to fabricate optical fibers on-demand via the FiberTechLille platform. The aim is at investigating modulation instability in uniform, topographic and/or few-mode fiber cavities, from the linear regime to the formation of spatio- temporal chaos through ultra-precise real-time recordings based on time lens systems, dispersive Fourier transform or multi-heterodyne detection systems. New resonators architectures will be developed to overcome limitations of standard fiber resonators limitations which might open new fields of investigations. These investigations appear in the very appealing context of frequency comb generation. The investigations will be performed in a stimulating research group composed of experts in nonlinear fiber optics and nonlinear dynamics, Alexandre Kudlinski (experiments, fiber fabrication), Matteo Conforti (theory nonlinear optics), Salya Coulibally (theory nonlinear dynamics) and Pascal Szriftgiser (experiments in cold atoms) within a group of other PhD students & postdocs.

keywords : passive resonators, chaos, optical fibers, nonlinear optics, parametric processes, frequency combs
skills: numerical simulations (Matlab), Fibre optics experiments, ultra-fast optics, nonlinear optics, RF electronics, basic knowledge in nonlinear dynamics

Bibliography

1. Mussot, A. *et al.* Fibre multi-wave mixing combs reveal the broken symmetry of Fermi-Pasta-Ulam recurrence. *Nat. Photonics* **12**, 303-+ (2018).
2. Bessin, F. *et al.* Real-Time Characterization of Period-Doubling Dynamics in Uniform and Dispersion Oscillating Fiber Ring Cavities. *Phys. Rev. X* **9**, 041030 (2019).
3. Bessin, F. *et al.* Gain-through-filtering enables tuneable frequency comb generation in passive optical resonators. *Nat. Commun.* **10**, 1–6 (2019).