

Postdoctoral opening in ultrafast fiber lasers at ICB, Dijon

Project **SPUTNIC**: SPatio-temporal Ultrafast dynamics in Nonlinear multimode optiCal fibers

Contact: Prof. Philippe Grelu, UBFC philippe.grelu@ubfc.fr

Postdoc duration: 12 months

Expected start: 1st October 2020

Location: on the Dijon Campus

Lab: ICB UMR 6303 CNRS / Photonics Department

Salary, monthly: (gross) ~2800€; (net) ~2300€

Funded by: Région Bourgogne Franche-Comté, FEDER & EIPHI Graduate School

Scientific context

It has long been thought that ultrashort optical pulses required single transverse mode propagation in optical fibers and waveguides, owing to the expected impact of the large intermodal dispersion. However, recent advances are building up a new paradigm, in which well-designed nonlinear coupling processes in multimode (MM) waveguides unveil a wide range of new spatiotemporal (ST) dynamics with a high potential of applications. These include Raman and Kerr self-beam-cleanup for high-power optical pulse propagation and the development of innovative spatiotemporal modelocked fiber lasers that can generate original ST pattern such as light bullets and three-dimensional optical soliton molecules, and surpass the power limitations of ultrafast fiber lasers operated with single transverse mode fibers.

Postdoctoral project

The project is mainly experimental. Within the platform of the Photonics Department at ICB, the postdoctoral fellow will develop ultrafast fiber laser cavities that incorporate MM fiber at various stages, such as:

- To provide an effective saturable absorber effect based on nonlinear multimodal interference,
- To yield high pulse energy,
- To generate spatio-temporal dissipative solitons and patterns, and develop advanced ultrafast characterization schemes.

Required competences

The candidate will have a successful research experience in ultrafast fiber laser and/or nonlinear optics including experimental setup design and ultrafast optical characterization. Competence in numerical modeling is appreciated. Fluency in English (B2) is required.