Temporal solitons in fiber resonators

Optical solitons are self-localized light beams. They are sustained by a balance between nonlinear effects and a diffusion-like process, whether diffraction of dispersion. They are solutions of the seminal nonlinear Schrödinger equation where nonlinearity exactly balances diffraction (spatial solitons) or dispersion (temporal solitons). Dissipative solitons are a subset of solitons that, through added balance between loss and gain, can travel indefinitely in resonators. Temporal cavity solitons (CSs) in particular, are sustained by coherent driving and recently attracted a lot of interest in the context of frequency comb generation. I will start with the history of CSs and give an overview of experimental results in fiber resonators. I will discuss recent results of CS formation through parametric driving as well as with intracavity gain and phase modulation.

Lecturer: François received his PhD, entitled “experimental and theoretical study of dissipative structures in optical resonators”, from the University of Brussels in 2010. After a couple of postdoctoral stays, in Ghent and Auckland, he came back to Brussels to lead his own research team. In 2017, he was awarded a starting grant from the European research council to lead a full-scale effort to understand the dynamics of nonlinear resonators with a goal of generating novel optical sources for spectroscopy and ranging. Since 2018, he is a FNRS research associate at the University of Brussels.