

Basic of nonlinear and ultrafast photonics in nonlinear waveguides

Abstract: This two-hour talk offers a comprehensive introduction to the foundational principles governing ultrashort pulse propagation in photonic waveguides. Together, we will explore how dispersion and Kerr nonlinearities sculpt the spectro-temporal evolution of light, examining how different dispersion regimes fundamentally alter pulse dynamics.

Beyond the basics, we will delve into the core building blocks of nonlinear dynamics, focusing on the formation of coherent structures like optical solitons and the mechanics of modulation instability. The discussion will also cover critical higher-order phenomena, including Raman scattering. Bringing theory to life, the presentation will be illustrated with a variety of cutting-edge, real-world applications.



Lecturer: Christophe FINOT is professor of Physics at the University Bourgogne-Europe (Dijon, France). Born in France in 1978, he graduated from the Institut d'Optique Graduate in 2002, and received a PhD in Physics from the University of Bourgogne in 2005 before spending a year at the Optoelectronics Research Center, in Southampton. Appointed associate professor in 2006, he was promoted to professor in 2010.

His main research areas dedicated to ultrafast photonics in fiber concern nonlinear optical shaping, all-optical information processing, extreme events as well as fiber lasers. More recently, he has taken an interest in the implementation of machine-learning approaches. He has coauthored more than 200 publications in international journals. He is currently Editor-in-Chief of the journal Optics Communications.