

Title: Playing with optical waves for efficient and ultrafast signal processing

Abstract: This talk will provide an introduction and overview of the field of optical signal processing, with a focus on a highly efficient general methodology using linear phase-only light-wave manipulations. This methodology has enabled the realization of many novel and greatly enhanced signal analysis and processing functionalities for a wide range of applications, from high-speed telecommunications to sensing and spectroscopy, using simple fiber-optics or integrated-waveguide device technologies. To illustrate the general methodology, the talk will provide an in-depth insight into a new framework of broad practical interest, namely, passive amplification of time- and frequency-domain waveforms with unique denoising capabilities for both classical signals and quantum correlation functions. This approach to noise mitigation enables the recovery of information that could not be accessed otherwise, pushing new frontiers in both fundamental and applied sciences.

Bio: José Azaña (*Optica* Fellow) received the Telecommunication Engineer degree and PhD degree in Telecommunication Engineering from the Universidad Politécnica de Madrid (UPM), Spain, in 1997 and 2001, respectively. Following research internships at the University of Toronto in Canada (1999) and the University of California – Davis in USA (2000), he conducted postdoctoral research work at McGill University in Montreal, Canada (2001-2003). Subsequently, he joined the Institut National de la Recherche Scientifique – Centre Energie, Matériaux et Télécommunications (INRS-EMT) in Montreal, where he is currently a Professor, and has been the holder of the Canada Research Chair in “Ultrafast Photonic Signal Processing”.

Prof. Azaña’s research interests include temporal optics, photonics-enabled broadband signal generation, characterization and processing, all-fiber and integrated-waveguide technologies, optical telecommunications, and quantum photonics. He has served in the technical program committee of numerous scientific conferences and technical meetings, and presently, he is a Senior Editor of the IEEE Photonics Journal and an Associate Editor of the IEEE Photonics Technology Letters. Prof. Azaña’s research outcome

has been recognized with several research awards and distinctions, including the XXII national prize for the “best doctoral thesis in data networks” from the Association of Telecommunication Engineers of Spain (2002), the “extraordinary prize for the best doctoral thesis” from UPM (2003), the 2008 IEEE-Photonics Society Young Investigator Award, the 2009 IEEE-MTT Society Microwave Prize, and the 2020 Canada Brockhouse Prize for interdisciplinary research in science and engineering.