

Photonic Generation and Processing of Microwave Arbitrary Waveforms Using Advanced Fiber Bragg Gratings

Chao Wang

PhD

Microwave Photonics Research Laboratory

School of Information Technology and Engineering

University of Ottawa, Canada

Abstract

Microwave photonics is an interdisciplinary area that studies the interaction between microwave and lightwaves, for applications such as broadband wireless access networks, wireless sensors networks, radar and instrumentation. Photonic generation and processing of arbitrarily shaped microwave waveforms has been of great interest in the area of microwave photonics in recent years. Thanks to advantages of the high speed and the broad bandwidth offered by optics, photonic-assisted techniques provide the capabilities of generating and processing high-frequency and broad-bandwidth microwave arbitrary waveforms which may not be easily fulfilled by conventional electronic techniques due to the limited bandwidth. In this talk, techniques to generate and process microwave arbitrary waveforms in the optical domain using advanced fiber Bragg gratings (FBGs) are presented, with an emphasis on the system architectures in which FBGs are employed as spectral shapers and dispersive elements.

Bio

Chao Wang received his B.E. degree in Opto-electrical Engineering from Tianjin University (2002), the M.S. degree in Optics from Nankai University (2005), and the PhD degree in Electrical and Computer Engineering from the University of Ottawa (2010). He will be with the Department of Electrical Engineering at the University of California, Los Angeles as an NSERC Postdoctoral Fellow.

His current research interests include photonic microwave arbitrary waveform generation and processing, radio-over-fiber systems, coherent optical pulse shaping, optical signal processing, ultrafast optical sensor interrogation, advanced fiber Bragg gratings and their applications in microwave photonics systems. He has authored or co-authored over 40 papers, including 26 papers published in peer-reviewed journals and 2 invited papers presented at major

international conferences. He also received the 2009 IEEE Photonics Society Ottawa Chapter Annual Best Student Paper Award and the Best Student Paper Awards at 2009 Asia-Pacific Microwave Photonics Conference and 2010 IEEE International Topical Meeting on Microwave Photonics.

During his PhD study, Dr. Wang has received several national and international awards and scholarships, including the SPIE Scholarship in Optical Science & Engineering (2008), the Chinese Government Award for Outstanding Graduate Students Abroad (2009), the Vanier Canada Graduate Scholarship (2009), the IEEE Photonics Society (formerly LEOS) Graduate Student Fellowship (2009), the IEEE Microwave Theory and Techniques Society Graduate Fellowship (2010) and the Canada NSERC Postdoctoral Fellowship (2010).