



Optical Components for Reconfigurable Photonic Networks and Mobile Systems

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Title: Optical components for reconfigurable photonic networks and mobile systems

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Abstract

The bandwidth of wireless networks needs to grow exponentially over the next decade, due to an increasingly interconnected and smart environment. Low-cost, compact and broadband wireless transceivers will be required. The current WiFi frequency bands do not have enough capacity and wireless communication needs to move to the millimeter-wavelength or sub-terahertz range. Radio-over-Fiber (RoF) technologies have evolved from a blue sky academic topic in the 90s to a main driver within the current quest for the 5th generation mobile systems (5G). A twist in RoF technologies is that it has found along the way niches in areas non purely related to communication technologies (ICT) applications: distribution of highly pure clock signals for radio telescopes, photonic-based coherent radar and fiber optic sensing. It is however in the communication arena where RoF seems to be able to provide a technological edge; RoF techniques based on photonic technologies enable to generate, transport and radiate in a straight forward manner microwave and millimeter wave signals. Although electronic technologies are able to sustain an increase in frequency from a technology point of view, with current development about to hit the Terahertz regime, the complexity of fabrication and to integrate this solutions have to compete with the off the self solutions provided by RoF technologies. Technologically though, reconfigurable Radio-over-Fiber networks require a co-design effort involving tunable lasers, digital signal processing, high speed modulators and photodiodes and optical switching technologies. A deep overview on the state-of-the-art and current efforts towards optical components enabling photonic reconfigurability will be given during the presentation.

Biography

J. J. Vegas Olmos received the B.Sc. and the M.Sc. in Telecommunications and Electronic Engineering, respectively, in 2001 and 2003. He obtained the Ph.D. degree from the Eindhoven University of Technology, The Netherlands, in 2006. He also holds a M.A. in East Asian Studies, a B.Ec. in Business Administration, and an MBA. He was a Research Fellow at Osaka University, Japan, from 2006 to 2008, and a Research Associate at the Central Research Laboratory, Hitachi Ltd, Japan. Since 2011, he is with the Technical University of Denmark, where he is an Associate Professor at the Department of Photonics Engineering. J.J. is an IEEE Senior Member, recipient of the Villums Fonden Young Investigator Award 2015; he is currently involved in EC IPHOBAC-NG, DFF mmW-SPRAWL and Marie Curie FIWIN5G, all projects on development of photonic technologies for future optical networks and mobile systems, from technology to systems.