Abstract

A review of nonlinear optical fiber based parametric amplifiers is provided. Basic principles will be outlined and fundamental performance characteristics will be discussed. Their implementation in both phase-insensitive mode and phase-sensitive mode of operation will be highlighted. Various actual and potential applications, such as high bandwidth optical sampling, will be discussed. In particular, our recent results showing their potential use as in-line amplifiers, resulting in significant link performance improvement is discussed.

Brief Bio

Peter Andrekson received his Ph.D. from Chalmers University of Technology, Sweden, in 1988. After about three years with AT&T Bell Laboratories, Murray Hill, N.J., he returned to Chalmers where he is now a full professor at the Department of Microtechnology and Nanoscience. He was Director of Research at Cenix Inc. in Allentown, PA, USA, during 2000 – 2003 and with the newly established Center for Optical Technologies at Lehigh University, Bethlehem, PA, during 2003 – 2004. His research interests include nearly all aspects of fiber communications such as optical amplifiers, nonlinear pulse propagation, all-optical functionalities, and high spectral efficiency transmission. He is co-founder of the optical test & measurement company Picosolve Inc., now part of EXFO where Andrekson is Director of EXFO Sweden AB. Andrekson is a Fellow of the Optical Society of America and of the IEEE. He is the author of about three hundred fifty scientific publications and conference papers in the area of optical communications, including two tutorials at the Optical Fiber Communication Conference (OFC) in 2004 and 2011. He is an elected member of the Board of Governors for the IEEE Photonics Society and is or has served on several technical program committees, and has also twice served as an expert for the evaluation of the Nobel Prize in Physics. He was an associate editor for IEEE Photonics Technology Letters during 2003-2007. In 1993 he was awarded a price from the Swedish government research committee for outstanding work performed by young scientists, and in 2000 he was awarded the Telenor Nordic research award for his contribution to optical technologies. Currently he holds an ERC Advanced Grant for work on phase-sensitive optical amplifiers.

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