

8th International Conference and Exhibition on

LASERS, OPTICS & PHOTONICS

November 15-17, 2017 | Las Vegas, USA

Fiber-based sources spanning UV to Mid-IR

Nasser Peyghambarian^{1,2}¹NP Photonics, Inc., USA²University of Arizona, USA

Phosphate, telluride and fluoride glasses allow new fiber laser frequencies. Nonlinear effects including Second Harmonic Generation (SHG), Optical Parametric Oscillators (OPO), Stimulated Raman Scattering (SRS) and Stimulated Brillouin Scattering (SBS) extend the operating wavelengths. However, some nonlinear effects including SRS in some cases are not desirable as they prevent high power operation. Our recent advances include: Demonstration of blue laser using Tm-doped fluoride glass; Demonstration of mid-infrared (mid-IR) frequency comb spanning from 7.5-11.6 μm using difference frequency generation (DFG) in a AgGaS_2 crystal with a compact all-fiber source based on Tm and Er-amplifiers. The power of the mid-IR signal is measured to be 1.55mW and the photon conversion efficiency is 15%. The pulse duration achieved in the mid-IR range is estimated to be around 80fs, which corresponds to 2.6 optical cycles at 9.2 μm center wavelength. The current approach allows simple power scaling by further amplification of the pump and signal pulses using established amplifier technologies. Demonstration of Er³⁺-doped ZBLAN fiber amplifier for Q-switched pulses at 2.79 μm is reported. Over 24 μJ pulse energy at an average output power of 1.0 W was achieved at a pump power of 9.4 W. The efficiency of this pulsed laser fiber amplifier is about 10%. Our simulation predicts that over 250 μJ pulses can be achieved with this fiber amplifier when a 120 W pump is used. Demonstration of mid-IR supercontinuum sources will also be discussed.

Biography

Nasser Peyghambarian is a Professor at the College of Optical Sciences and the Department of Materials Science and Engineering at the University of Arizona (UA), as well as the Director of the NSF Engineering Research Center for Integrated Access Networks and the UA Chair of Photonics and Lasers. He is a Fellow of the AAAS, OSA, SPIE, APS and NAI. He has over 600 publications in peer-reviewed journals and more than 700 invited talks, conference proceedings and presentations. He has authored or co-authored 28 books and book chapters and is the inventor on 38 patents.

nasser@optics.arizona.edu

Notes: