Johann Riemensberger
Department of Electronic Systems, Norwegian University of Science and Technology

Nonlinear and hybrid integrated photonics with ferroelectric thin film waveguides and III-V compound semiconductors

Nonlinear integrated photonics combine low-loss optical waveguide and microresonator technology, dispersion engineering, and highly nonlinear optical materials together to generate, amplify, and frequency-convert optical fields on photonic chips. Over the last 20 years enormous progress has been made based on silicon and silicon nitride sub-micron waveguides yet limitations due to two-photon absorption and low nonlinearities have shown limits. Currently, smart-cut ferroelectric thin films such as thin-film lithium niobate (LNOI) are revolutionizing integrated photonics, overcoming the traditional limitations of bulk lithium niobate and silicon(nitride)-on-insulator photonic integrated circuits. This talk will review recent progress on nonlinear photonics facilitated by two rather new platforms - gallium phosphide and lithium tantalate - and outline future potential of these platforms for hybrid integration with pump lasers.