variational approach. We also consider the regimes of nonelastic collisions of co-propagating solitary waves in such system. The pulse group velocity and frequency can be changed during the interaction. The effects of pulse reflection, tunneling, blocking and trapping are found by variational approach and numerical simulations.

From optical rogue waves to optical transistors

A. Demircan, Sh. Amiranashvili, G. Steinmeyer
Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany, e-mail: ayhan.demircan@gmx.de

We demonstrate that nonlinear wave interaction between fundamental solitons with surrounding dispersive waves in a nonlinear optical fiber leads to intermittent giant waves with all signatures of rogue waves. The main mechanism is based on the concept of an optical event horizon and is naturally given in the supercontinuum process. Using this mechanism in a deterministic way makes an all-optical control of light pulses possible. This can be done in a very efficient and versatile manner with the opportunity to overcome the main limitations for realizing an optical transistor.

Optical information transmission by femtosecond quasidiscreate spectral supercontinuum with 70 TBit/s rate

S.A. Kozlov, A.A. Drozdov, S.E. Putilin, A.N. Tsypkin
Photonics and Optoinformatics Department, SPb National Research University of ITMO, Saint-Petersburg, Russia, e-mail: kozlov@mail.ifmo.ru

Physical principles of encoding and data transmission by quasidiscrete spectral supercontinuum obtained by the interference of phase-modulated light pulses with superbroadened spectra are discussed. The possibility of ultrafast data transmission at the rate of 70 Tbit/s is demonstrated experimentally.

A rigorous physical approach to a proper analysis of wave propagation in planar and fiber waveguides

S.V. Tsvetkov
Physics Department, MGUPI, Moscow, Russia, e-mail: it3@mgupi.ru

There are some fundamental problems in classical analytic methods for light propagation in planar and fiber waveguides, due to an improper use of plane wave terms and complex-valued functions. Such problems could be rigorously solved with the help of real domain new parametric wave functions and solutions