

2nd International Conference and Exhibition on **Lasers, Optics & Photonics**

September 08-10, 2014 Hilton Philadelphia Airport, USA

Photorefractive surface solitons due to quadratic electro-optic effect

Kaiyun Zhan

China University of Petroleum, China

The surface solitons propagation dynamics at the interface of nonlinear media with periodic refractive-index has become a considerate topic in nonlinear optics for their potential important applications in optical sensing, switching and exploration of intrinsic and extrinsic surface characteristics. At present, many fantastic optical surface solitons have been a subject of intense study in these nonlinear media with Kerr nonlinearity and saturable nonlinearity via Pockels effect. Spatial solitons in centrosymmetric photorefractive media due to quadratic electro-optic effect require a smaller nonlinearity. Here, we have got a deep understanding on the band structure of several types of optical lattices in centrosymmetric photorefractive crystals and have predicted theoretically several types of surface solitons, i.e., gap solitons, defect solitons, superlattice solitons and surface solitons driven by diffusive effect media in centrosymmetric photorefractive crystals. Moreover, we systematically studied the factors affected these surface solitons in centrosymmetric photorefractive crystals, five physical factors, i.e., the external bias electric field, lattice depth, profile of signal beam, saturation parameter and diffusion process, were considered. The quantitative relationship between the factors and the conditions, characteristics, stability and existence of surface solitons was established. For saturation parameter being strong temperature-dependent, we could adjust the crystal temperature to change surface soliton properties. This is a new optical control scheme for these surface solitons.

Biography

Kaiyun Zhan has completed his Doctorate of Science at the age of 30 years from Department of Physics, Harbin Institute of Technology, China, in 2011. He is a teacher at the College of Science, China University of Petroleum, China. His research interests are mainly in nonlinear optics, solitons and nonlinear optical materials. He has more than 25 publications in refereed journals, and these papers have been cited more than 100 times according to Google Scholar.

zhanky@upc.edu.cn