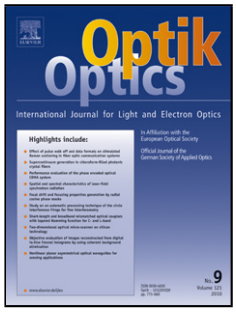

Title: Manakov Solitons in Photorefractive Crystals with Both the Linear and Quadratic Electro-optic Effects Due to the Two-photon Photorefractive Effect

Authors: Qiang Wang, Lili Hao, Hongxia Tang, Chunfeng Hou

PII: S0030-4026(17)30398-4
DOI: http://dx.doi.org/doi:10.1016/j.ijleo.2017.04.008
Reference: IJLEO 59050

To appear in:

Received date: 4-1-2017
Accepted date: 3-4-2017

Please cite this article as: Qiang Wang, Lili Hao, Hongxia Tang, Chunfeng Hou, Manakov Solitons in Photorefractive Crystals with Both the Linear and Quadratic Electro-optic Effects Due to the Two-photon Photorefractive Effect, Optik - International Journal for Light and Electron Opticshttp://dx.doi.org/10.1016/j.ijleo.2017.04.008

Manakov Solitons in Photorefractive Crystals with Both the Linear and Quadratic Electro-optic Effects Due to the Two-photon Photorefractive Effect

Qiang Wang[a], Lili Hao[a,*], Hongxia Tang [b], Chunfeng Hou[c]

[a] *Department of Physics, Northeast Petroleum University, Daqing, 163318, China*

[b] *College of Electrical Engineering, Suihua University, Suihua, Heilongjiang, 152000, China*

[c] *Department of Physics, Harbin Institute of Technology, Harbin, 150001, China*

Corresponding author: Lili Hao

Corresponding address: Department of Physics, Northeast Petroleum University, Daqing, 163318, People's Republic of China

Electronic mail: Haolili0820@126.com

Telephone: 86-459-6504127

Abstract

We have first investigated Manakov solitons in biased two-photon photorefractive crystals in which refractive index changes are governed by both the linear and quadratic electro-optic effects simultaneously. Our results show that Manakov soliton pairs can be supported in all three possible realizations: dark-dark, bright-bright and dark-bright under steady-state conditions provided that the total intensity of the two mutually inherent beams is much lower than that of dark irradiance. It is also found that these Manakov solitons owe their existence to the co-effect of the linear and quadratic electro-optic effect where PR effect may be enhanced, weakened or even counteracted with each other. Moreover, the intensity full widths at half maximum of these Manakov solitons are inversely proportional to the square root of the quadratic polynomial of the