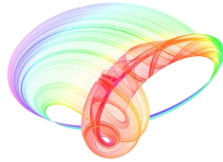


Book of abstracts



PHOTONICA2019

The Seventh International School and Conference on
Photonics, 26 August – 30 August 2019, Belgrade, Serbia

& Machine Learning with Photonics Symposium
(ML-Photonica 2019)



& ESUO Regional Workshop



& COST action CA16221



Editors: Milica Matijević, Marko Krstić and Petra Beličev

Belgrade, 2019

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Localized modes in two-dimensional “plus” lattice

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We have proposed a design of new photonic lattice which does not exist in nature but might be easily fabricated by femtosecond laser inscription technique. The novel two-dimensional photonic lattice comprises of square elementary plaquette inscribed in dodecagon elementary plaquette. Unit cell of the lattice consists of five linearly coupled sites distributed at the edges and in the center of a “plus” sign. Existence and stability of linear and nonlinear localized modes in the uniform and binary “plus” lattice are numerically investigated.

The energy spectrum of linear lattice is characterized by a flat band (FB) and four dispersive bands (DB). The FB intersects with two neighboring DBs at four Dirac points at the end of and one in the middle of the Brillouin zone [1]. The lattice binarity provided the opening of gaps between DBs. At the end of the first stage of our study, we can report the existence of FB modes, i.e. compactons, which in the presence of nonlinearity lose the stability owing to the Fano-resonances with the extended states from DBs [2]. In addition, we found a pair of new nonlinear localized mode families in gaps opened by binarity, which could be stable in certain regions of the nonlinearity parameter. The next challenge is related to searching for edge modes and energy transport characteristics in the lattice.

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