**Compact localized modes in the flux dressed 2D octagonal-diamond photonic lattice in the presence of nonlinearity**

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The flat-band lattice systems attract researches in photonics owing to peculiar transport properties and localization of light in the absence of dispersion [1, 2]. Moreover, the photonic flat-band systems are easy manageable platforms for testing the properties of the nearly flat band systems in the context of the condensed mater physics. Here, we extend our previous study [3] of the compact localized modes in the two-dimensional photonic octagonal-diamond lattice (ODL) dressing it with artificial flux.

We provide a routine to change the band structure of the ODL, with two flat-bands interrelated by one dispersive band (flux-free case), to those with one fully gapped flat-band by tuning the value of the artificial flux [4]. The possibility of realization of the proposed system in the laboratory is offered by experiments with optical resonators and the femto-second laser inscribed curved lattices.

The flat-band compact localized linear eigenmodes will be examined numerically. The main aim is to test their robustness to the presence of the local nonlinearity. We investigate dependence of the dynamical properties of the nonlinear localized modes continued by nonlinearity from the linear compacton families on the flux-determined flat-band pattern.

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