

Interface solitons in quadratic nonlinear photonic lattices

Xu, Zhiyong

Molina, Mario I.

Kivshar, Yuri S.

We study the properties of two-color nonlinear localized modes which may exist at the interfaces separating two different periodic photonic lattices in quadratic media, focusing on the impact of phase mismatch of the photonic lattices on the properties, stability, and threshold power requirements for the generation of interface localized modes. We employ both an effective discrete model and continuum model with periodic potential and find good qualitative agreement between both models. Dynamic excitation of interface modes shows that a two-color interface twisted mode splits into two beams with different escaping angles and carrying different energies when entering a uniform medium from the quadratic photonic lattice. The output position and energy contents of each two-color interface solitons can be controlled by judicious tuning of the lattice parameters. © 2009 The American Physical Society.