

Surface multi-gap vector solitons

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We analyze nonlinear collective effects near surfaces of semiinfinite periodic systems with multi-gap transmission spectra and introduce a novel concept of multi-gap surface solitons as mutually trapped surface states with the components associated with different spectral gaps. We find numerically discrete surface modes in semi-infinite binary waveguide arrays which can support simultaneously two types of discrete solitons, and analyze different multi-gap states including the soliton-induced waveguides with the guided modes from different gaps and composite vector solitons. © 2006 Optical Society of America.