

Collapse suppression and stabilization of dipole solitons in two-dimensional media with anisotropic semi-local nonlinearity

Fangwei Ye, Boris A. Malomed, Yingji He, Bambi Hu

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We consider the impact of anisotropic nonlocality on the arrest of the collapse and stabilization of dipole-mode (DM) solitons in two-dimensional (2D) models of optical media with the diffusive nonlinearity. The nonlocal nonlinearity is made anisotropic through elliptic diffusivity. The medium becomes semi-local in the limit case of 1D diffusivity. Families of fundamental and DM solitons are found by means of the variational approximation (VA) and in a numerical form. We demonstrate that the collapse of 2D beams is arrested even in the semi-local system. The anisotropic nonlocality readily stabilizes the DM solitons, which are completely unstable in the isotropic medium.

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