

Spontaneous and engineered transformations of topological structures in nonlinear media with gain and loss

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In contrast to conservative systems, in nonlinear media with gain and loss the dynamics of localized topological structures exhibit many unique features that can be controlled externally. We propose a robust mechanism to perform topological transformations changing characteristics of dissipative vortices and their complexes in a controllable way. We show that a properly chosen control carries out the evolution of dissipative structures to regime with spontaneous transformation of the topological excitations or drives generation of vortices with control over the topological charge.

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