Soliton pairing of two coaxially co-propagating mutually incoherent 1-D beams in Kerr type media

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Keywords

Kerr media, self-focusing, spatial solitons, soliton pairing

Abstract

In this paper, we have developed a theory (using parabolic equation approach) of coupled propagation of two coaxially co-propagating and mutually incoherent bright 1-D beams in Kerr type media. We have provided a detailed account of the propagation behavior and condition of formation of spatial soliton pairs for various coupling coefficients (κ = 1, 2/3, 2) when wavelengths and widths of the beams are the same/different. We have also identified conditions for a distinct type of coupled propagation. Our simple and straightforward theory presents many features of co-propagating beams which are in agreement with the features reported earlier using coupled nonlinear Schrödinger equation (NLSE). The paper adds to the understanding of coupled propagation by revealing many additional features not reported earlier.

1005.2 kB

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