论文

中心对称双光子光折变低振幅灰孤子时间特性

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摘要：

为了得到中心对称双光子光折变晶体中低振幅灰空间孤子时间特性的结果,基于中心对称光折变晶体中双光子光折变效应的理论模型,推导出了含时间参量的空间电荷场和光波动态演化方程.采用数值方法,得到了低振幅灰孤子强度包络和强度半峰全宽的时间演化特性.结果表明:初始阶段形成宽度较宽的孤子,其宽度随时间单调递减到一个最小值直至稳态孤子的形成;在相同的演化时间内,孤子半峰全宽随着孤子峰值强度与暗辐射比值的增大而变小.研究了不同时间下低振幅灰孤子动态演化特性.

关键词： 非线性光学　中心对称光折变介质　双光子光折变效应　空间孤子　低振幅　时间行为

Temporal Behavior of the Low-amplitude Grey Spatial Solitons in Two-photon Centrosymmetric Photorefractive Crystal

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Abstract:

In order to study the temporal behavior of the low-amplitude grey spatial solitons in two-photon centrosymmetric photorefractive crystals, the expressions of time-dependent space-charge field and dynamical evolution equation are obtained, based on the two-photon photorefractive effect in centrosymmetric photorefractive crystals. The temporal behavior of the intensity profiles and the intensity full width at half maximum of grey solitons are obtained by numerical method. The results indicate that the intensity width of spatial solitons generated at the beginning decreases monotonously to a minimum value until steady state. Within the same propagation time, the higher the ratio of solitons' peak intensity to the dark irradiation intensity is, the shorter the intensity full width at half maximum of grey solitons is. Dynamical evolutions of the low-amplitude grey spatial solitons are simulated numerically at different time.

Keywords: Nonlinear optics　Centrosymmetric photorefractive material　Two-photon photorefractive effect　Spatial soliton　Low-amplitude　Temporal behavior

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