

论文

双光子光折变介质中非相干耦合亮-暗屏蔽光伏孤子对

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摘要:

对有外加电场的双光子光伏光折变晶体中两束偏振方向和波长都相同的互不相干光束的耦合进行研究,给出产生亮-暗双光子光折变屏蔽光伏孤子对需满足的条件。以Cu:KNSBN晶体作为研究对象,选取 $\alpha=117.3$, $\beta=83.79$, $\eta=1.5\times 10^{-4}$, $\sigma=104$, $\delta=0.005$, $r=10$ 时,给出双光子光折变晶体中的非相干耦合亮-暗屏蔽光伏孤子对2个孤子分量光强的空间分布,证明有外加电场的双光子光伏光折变晶体中存在非相干耦合亮-暗屏蔽光伏孤子对,指出孤子对是由偏振态和波长都相同的两束互不相干光形成的,当外加电场方向和晶体中光伏电场的方向与晶体光轴方向相同时,双光子光折变晶体中可支持亮孤子峰值光强稍大于暗孤子最大光强的非相干耦合亮-暗孤子对,当外加电场方向和晶体中光伏电场的方向与晶体光轴方向相反时,双光子光折变晶体中可支持亮孤子峰值光强稍小于暗孤子最大光强的非相干耦合亮-暗孤子对。

关键词: 非线性光学;光折变效应;双光子光折变介质;空间光孤子

Incoherently coupled bright-dark screening-photovoltaic soliton pairs in two-photon photorefractive media

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Abstract:

The incoherent coupling of two mutually incoherent optical beams with the same polarization and wavelength in biased two-photon photovoltaic photorefractive crystals was investigated. The condition which is needed for producing two-photon incoherent coupled bright-dark screening photovoltaic soliton pairs is presented in the paper. Taking Cu:KNSBN crystal as a research object, the light intensity spatial distribution of two soliton components of incoherently coupled bright-dark screening-photovoltaic soliton pairs in two-photon photorefractive crystal is given while $\alpha=117.3$, $\beta=83.79$, $\eta=1.5\times 10^{-4}$, $\sigma=104$, $\delta=0.005$, $r=10$ is selected. The research verified that there are incoherently-coupled bright-dark screening photovoltaic soliton pairs in the two-photon photovoltaic photorefractive crystal that has applied electric field. It is pointed out that the soliton pairs are formed by two incoherent beams which have same polarization state and wavelength.

Keywords: nonlinear optics; photorefractive effect; two-photon photorefractive medium; spatial optical soliton

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