光子学报 2008, 37(Sup2) 33-36 DOI: ISSN: 1004-4213 CN: 61-1235/O4

论文

基于耦合谐振透明效应的环中环结构中的光速减慢

王楠[1],万晶[2],掌蕴东[1],王金芳[1],田赫[1],王号[1],欧阳秋云[1],袁萍[1]

1. 哈尔滨工业大学光电子研究所
2. 哈尔滨工业大学图书馆

摘要：

本文理论分析了环中环结构中的耦合谐振透明.利用迭代法建立了理论模型. 推导了谐振情况下群折射率的精确表达式. 理论结果与数值模拟结果符合得很好. 深入讨论了反射系数对群折射率和CRIT线宽的影响. 通过选择合适的参数, 群折射率可高达102~ 104. 这种结构在光通信领域有潜在的应用, 如光缓存, 光信号延迟器, 光学时延线等.

关键词： 光通信；慢光；耦合谐振透明；群折射率 optical communication; slow light; CRIT; group index

Slow-light in Coupled-Resonator-Induced Transparency based on A ring-in-ring structure

Abstract:

a ring-in-ring structure of two rings with different diameters were designed to yield coupled-resonator-induced transparency. According to iterative approach, a theoretical analytic model is established. Explicit expression of the group index at resonance is derived and discussed, and the theoretic result is in agreement with numerical result. The influences of the reflection coefficients on the group index and the CRIT linewidth are fully studied. With proper choice of the parameters, the group index can reach as high as 102~ 104. We believe that the ring-in-ring structure can be used as optical buffers, signal retarders, optical delay line for optical communication.

Keywords:

收稿日期 2008-12-15 修回日期 2008-12-18 网络版发布日期 2008-12-30

DOI:

基金项目:

国家自然科学基金资助

通讯作者: 王楠

作者简介:

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