



吉首大学学报自然科学版 » 2012, Vol. 33 » Issue (2): 50-54 DOI: 10.3969/j.issn.1007-2985.2012.02.012

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在准1维分子晶格模型中的量子孤波

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Quantum Solitary Wave in a Quasi-One-Dimensional Molecular Crystal Model

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摘要 通过使用态方法和准离散多尺度方法,研究了准1维分子晶格模型中的量子孤波解,表明在这种模型中,不仅存在运动的量子孤波,也存在静态的量子孤波(即量子内禀局域模).利用所获得的量子孤波解,进一步研究了量子孤波的能级,得知量子孤波的能量是量化的,这种非线性的量子化特性,可能导致在这种材料中观察到像量子化的热输运等奇妙的量子化现象.

关键词: 准1维分子晶格 量子孤波 能级

Abstract: By using the number state method and the simplified method of quasidiscreteness multiple scales, the authors have studied quantum solitary wave solutions in a quasi-one-dimensional molecular crystal model. In this model, there are both traveling and stationary quantum solitary waves. With the help of the obtained quantum solitary wave solution, the energy levels of the quantum solitary wave have been investigated further. It is shown that the energy of the quantum solitary wave is of quantization, which makes it possible to observe quantum thermal conduction in the material.

Key words: quasi-one-dimensional molecular crystal model quantum solitary wave energy level

基金资助:

湖南省教育厅科学研究项目(10A100)

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引用本文:

邓翊群,李德俊. 在准1维分子晶格模型中的量子孤波[J]. 吉首大学学报自然科学版, 2012, 33(2): 50-54.

DENG Yi-Qun, LI De-Jun. Quantum Solitary Wave in a Quasi-One-Dimensional Molecular Crystal Model[J]. Journal of Jishou University (Natural Sciences Edit), 2012, 33(2): 50-54.

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