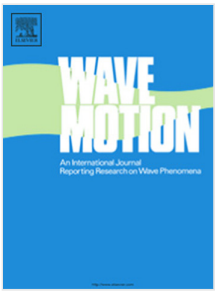

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Coupled Energy Patterns in Zigzag Molecular Chains

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Abstract

The contribution of both longitudinal and transversal nonlinear oscillations to energy localization is investigated in a zigzag molecular chain, which include simultaneously nearest- and next-nearest neighbor interactions. Coupled amplitude equations are found in the form of discrete nonlinear Schrödinger equations, whose plane wave solutions are found to be subjected to some instabilities. They are shown to be very sensitive to transverse and longitudinal couplings, which is confirmed via direct numerical simulations. The two available modes are found to be alternatively responsible for energy localization and transport. Thermal fluctuations effects bring about highly localized modes, along with narrow structures for efficient energy transport.

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