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Dynamics of localized structures in dissipative nonlinear lattices

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This talk reviews results about the existence of spatially localized waves in nonlinear chains of coupled oscillators, and provides new results for a model of a one-dimensional magnetic metamaterial formed by a discrete array of nonlinear resonators. Localized solutions include solitary waves of permanent form and traveling breathers which appear time periodic in a system of reference moving at constant velocity. For KG lattices of magnetic metamaterials, we obtain a general criterion for spectral stability of multi-site breathers for a small coupling constant. For the metamaterial lattices we focus on periodic traveling wave due to the presence of periodic force. We employ topological and variational methods to study the existence and the stability of periodic waves. These localized structures are also computed and discussed numerically.