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# *Mobility of discrete solitons in Hamiltonian quadratic nonlinear media*

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**Abstract**

We study the mobility of solitons in Hamiltonian lattices with quadratic nonlinearity. Using the notion of the Peierls–Nabarro potential and systematic numerical simulations, we demonstrate that, in contrast with their cubic counterparts, the discrete quadratic solitons are mobile not only in the one-dimensional setting, but also in two dimensions, in any direction. This may be an indication that there is a soliton solution with an exponentially decaying tail to the corresponding Hamiltonian advanced retarded equation of the considered system in a traveling coordinate frame. We identify as well parametric regions where an initial kick applied to a soliton leads to three possible outcomes, namely, staying put, persistent motion, or destruction. On the 2D lattice, the solitons survive the largest kick and attain the largest speed along the diagonal direction.