Two dimensional breathers in the frequency-momenta representation

Juan F.R. Archilla[1], Jānis Bajārs[2]
[1]*Group of Nonlinear Physics, Universidad de Sevilla, Sevilla, Spain*
E-mail: archilla@us.es
[2]*Faculty of Physics, Mathematics and Optometry,University of Latvia, Riga, Latvia*
E-mail: janis.bajars@lu.lv

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Discrete breathers are localized vibrations in nonlinear lattices that can be mobile. The observation of breathers in □-q representation, especially in the moving frame, has revealed to be very useful [1]. It was refined considering the frequencies in the moving frame [2]. In systems with a substrate potential, the generic solution is a breather joined to a wing, that is, an extended wave that travels with the breather [2].

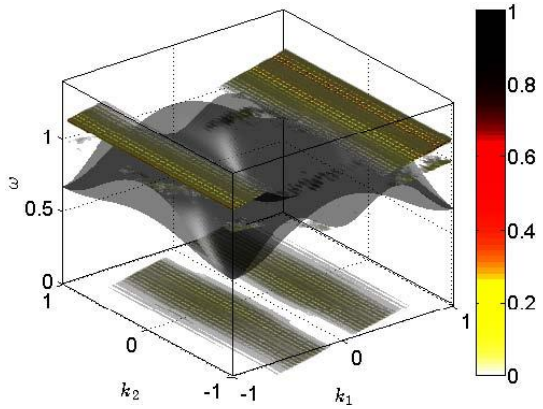

Fig. 1: The ω-q representation of a 2D breather coupled to a soliton travelling parallel to the k_1- axis. It consists of two planes parallel to the k_2-axis, that is, with $\partial\omega/\partial k_2=0$. Both planes cut the ω-axis at their frequency in the moving frame, equal to zero for the soliton and different from zero for the breather.

However, the theory had only been developed in one dimension. In this paper we extend it to two dimensions and apply it to a system that models the cation layer of silicates [3]. Breather lines transform in breather planes and it is revealed that breathers may have attached a soliton, depending on the initial conditions . References from the reference list must be cited in the text in square brackets, e.g. [1] for a single citation or [1, 3] for multiple citations. In the reference list, the font should be 10 point Times italic or Times New Roman italic.

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