

Abstract Submitted
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Multiparticle dynamics: nonlinearity and long-range forces¹

VLADIMIR HIZHNYAKOV, MATI HAAS, ALEKSANDER SHELKAN, IMBI TEHVER, Institute of Physics, University of Tartu, Riia 142, 51014 Tartu, Estonia, MIKHAIL KLOPOV, Tallinn University of Technology, Faculty of Science, Department of Physics, Ehitajate tee 5, 19086 Tallinn, Estonia — Nonlinear vibration interactions are well localized; as a consequence, intrinsic localized modes (ILMs) and other types of nonlinear modes can exist. On the contrary, linear interactions in 3D systems depend on long range forces (LRF), which make unsatisfactory MD simulations based on a cluster consideration. In [1-2], an analytical theory of ILMs was developed, which takes LRF into account. Here we present a method of MD simulations, which also includes LRF. It was found that LRF can qualitatively change the results: instead of ILMs with the frequency in the gap of the phonon spectrum one may obtain modes with the frequency above the spectrum. This allows one to conclude that the nonlinearity-induced localization of vibrational energy may exist much more widely than it was believed on the basis of the previous theories which neglect LRF. 1. V. Hizhnyakov et al, Phys. Rev. B, 73, 224302 (2006). 2. V. Hizhnyakov, A. Shelkan, M. Klopov, Physics Letters A, 357, 393 (2006). 3. A. Shelkan, V. Hizhnyakov, M. Klopov, Phys. Rev. B, 75, 134304 (2007).

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