

СЕКЦІЯ 5
НОВІ МАТЕРІАЛИ І ТЕХНОЛОГІЇ В
СІЛЬГОСПМАШИНОБУДУВАННІ

SH WAVES IN CUBIC CRYSTALS WITH SURFACE
DISTORTION TAKEN INTO ACCOUNT

dr. M. Bilinska¹, dr. O.Yu. Klochko²

¹ Jagiellonian University, Faculty of Physics, Astronomy and Computer Science
 (ul. prof. Stanisława Łojasiewicza 11, 30-348 Kraków, Poland)

² Kharkiv Petro Vasylenko National Technical University of Agriculture
 Technology of Materials Department, 45, Moskovskiy Ave., Kharkiv, 61050
 tel: (057)716-41-53, E-mail: techmat@ukr.net

The surface waves and volume vibration bands are considered with taking into account the interaction between the nearest and more distant neighbors in a cubic crystal. Expressions for dispersion relations, splitting values of surface waves off the bulk spectrum and decreasing amplitude parameters are obtained for crystalline systems in which the surface waves are the single-component and one-partial ones. The calculations are made with account for the crystal lattice discrete nature at arbitrary values of the two-dimensional wave vector. The analysis demonstrates (Fig.1) a complete agreement of the results obtained in the long-wavelength limit with those calculated in the framework of linear nonlocal elasticity theory [1,2]. The influence of an adsorbed surface monolayer on the characteristics of the surface waves is studied.

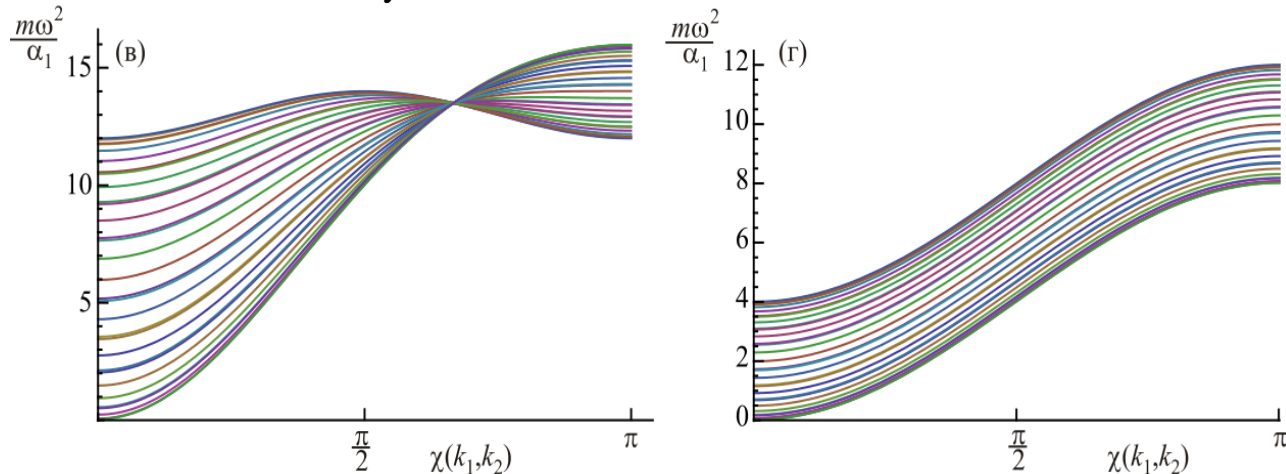


Fig. 1. Volume vibration band simple cubic crystal with adsorbed, (001) orientational surface. *Left panel*: no surface distortion, second neighbors taken into account; *right panel*: surface distortion taken into account, first neighbors estimation.

1. Klochko, M.S. Single-component single-partial acoustic surface waves in cubic crystals with surface distortion taken into account. *Low Temperature Physics* 40, 556 (2014); <https://doi.org/10.1063/1.4885575>

2. Bilinska, M., Klochko, O.Yu. Application of surface waves for studying the characteristics of gas-trapping sensors located on a solid surface. *Матеріали 16-го Міжнар. форуму молоді, м. Харків, 25-26 берез. 2020 р. - ХНТУСГ, 2020, P.37.*