

Power-Law in Depth-Dependence of Signal Speed in Vertical Granular Chain

XU Ai-Guo and Hong Jongbae

Department of Physics and Center for Strongly Correlated Materials Research, Seoul National University, Seoul 151-742, Korea

(Received: 2000-12-25; Revised: 2001-3-5)

Abstract: The signal generated by an initial perturbation dispersively propagates in the vertical granular chain under gravity. For the power-law-type contact force, the signal speed follows power-law with the depth. When the perturbation is very weak, the exponent is $1/2(1-1/p)$. When the perturbation is very strong, the exponent approaches zero. The transition of the exponent from oscillatory regime with weak nonlinearity to quasi-solitary regime with strong nonlinearity is smooth.

PACS: 45.70.-n, 43.25.+y, 46.40.Cd

Key words: soliton, granular chain, phase velocity, power-law behavior

[\[Full text: PDF\]](#)

Close