

Iranian Journal of Physics Research, Vol. 23, No. 1, 2023 DOI: 10.47176/ijpr.23.1.21617

Strong coupling of magnetization dynamics of two antiferromagnetic layers by phonons

M Shirdel-Havar and B Zare

Department of Physics, Iran University of Science and Technology, Tehran, Iran

E-mail: bzarer@iust.ac.ir

(Received 10 December 2022; in final form 17 January 2023)

Abstract

Strong and long-range coupling of the magnetization dynamics of the two antiferromagnetic layers mediated by the phonons transferred through a nonmagnetic insulator has been investigated. The magnetization dynamics in one of the antiferromagnetic layers via a magnetoelastic interaction leads to the excitation of phonons and their pumping to the nonmagnetic layer. The transfer of phonons, which carry angular momentum, through a nonmagnetic insulator from one antiferromagnetic layer to another, leads to an interference pattern in the absorption spectrum, which represents the coupling of magnetization dynamics of two layers.

Keywords: antiferromagnet, magnetoelastic interaction, magnon-phonon coupling.

For full article, refer to the Persian section