



## BOOK OF ABSTRACTS

7-11 DECEMBER | Virtual

The Joint European  
Magnetic Symposia 2020

4168

**Study of phonons' and magnons' properties in (Ni<sub>80</sub>Fe<sub>20</sub>/Au/Co/Au) multilayers of different number of repetitions**

Milosz Zdunek  
Adam Mickiewicz University

We have studied the properties of surface acoustic waves' [1] and spin waves' propagation in magnetic (Ni<sub>80</sub>Fe<sub>20</sub>/Au/Co/Au)<sub>N</sub> (3≤N≤12 - number of repetitions) multilayers. The multilayers were deposited on the naturally oxidized silicon substrate with a 30-nm-thick Au buffer layer. The experimental technique that we used was high-resolution Brillouin spectroscopy, which allows the investigation of both kinds of waves. The behavior of spin waves was studied in two experimental geometries: backward volume geometry (supporting the propagation of backward volume magnetostatic spin waves) and Damon-Eshbach geometry (supporting the propagation on surface magnetostatic spin waves) [2]. The thicknesses of permalloy (Ni<sub>80</sub>Fe<sub>20</sub>) and gold layers were 2 nm, while that of the cobalt layer was 0.8 nm [3,4]. The measurements were taken in different values of external magnetic field. The crossing of phonon and magnon dispersion relations has been investigated as well. In addition, we have performed simulations using the finite element method in order to obtain the theoretical dispersion dependencies.

[1] A. Trzaskowska, S. Mielcarek, B. Graczykowski, F. Stobiecki, J. Alloys Compd. 517, 132 (2012)

[2] M. Zdunek, A. Trzaskowska, J. W. Kłos, N. K. P. Babu, S. Mielcarek, J. Magn. Magn. Mater. 500, 166429 (2020)

[3] M. Urbaniak, F. Stobiecki, B. Szymański, A. Ehresmann, A. Maziewski, M. Tekielak, J. Appl. Phys. 101, 013905 (2007)

[4] F. Stobiecki, M. Urbaniak, M. Tekielak, B. Szymański, T. Luciński, M. Schmidt, A. Maziewski, J. Magn. Magn. Mater. 310, 2294 (2007)

This study was partially supported by the National Science Centre of Poland Grant No. UMO-2016/21/B/ST3/00452