

Defect states in the asymmetric magnonic crystal

J.W. Kłos,¹ M. Krawczyk,¹ S.L. Vysotsky,² Yu.V. Khivintsev,²
Yu.A. Filimonov,^{2,3} and S.A. Nikitov^{3,4}

¹*Faculty of Physics, Adam Mickiewicz University in Poznań, Poznań, Poland*

²*Kotelnikov Institute of Radio-Engineering and Electronics of RAS, Saratov, Russia*

³*Saratov State University, Saratov, Russia*

⁴*Kotelnikov Institute of Radio-Engineering and Electronics of RAS, Moscow, Russia*

We have investigated the magnonic states localized at the defect of 1D magnonic crystal (MC). In theoretical model the defect forms a cavity surrounded by two Bragg mirrors differing in the number of periods. We extended (shortened) the MC on the one (on the other) side of defect keeping the total number of periods unchanged. In the strongly asymmetric structure we have observed the shift of frequencies and the deterioration of quality of transmission peaks of the defect modes (DM's) resulting from the change in boundary conditions for exponentially decaying tails of DMs. We conducted also the measurements of spin wave transmission S_{21} in the 1D MC based on YIG film with periodic array of etched grooves. The defect was introduced by increase in distance between two selected grooves. While position of the sample with respect to antennas was changed the frequency of the DM was shifted.

*This work was supported by the FP7 No 247556 (NoWaPhen)
and RFFI No 13-07-00941, 14-07-00896.*