

# Magnetic excitations in patterned films studied by Brillouin Light Scattering technique

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Review of magnetic excitations experimental techniques studies will be focused on Brillouin Light Scattering (BLS) spectroscopy with time and space resolution. Selected results of magnetic excitation investigated in patterned both laterally yttrium iron garnet (YIG) films and in depth FeAl layers (ion irradiated) will be reported. Different spin waves (SW) “optical” effect such as reflection, refraction, focusing and diffraction<sup>1,2</sup> on micrometers thickness YIG films will be discussed. We shall show that adjusting the ion energy in FeAl layers can be used as a lever to manipulate the behavior of spin waves<sup>3</sup>. The application of quasi optical effects in patterned garnet film for switching of the spin waves will be discussed, see Fig.

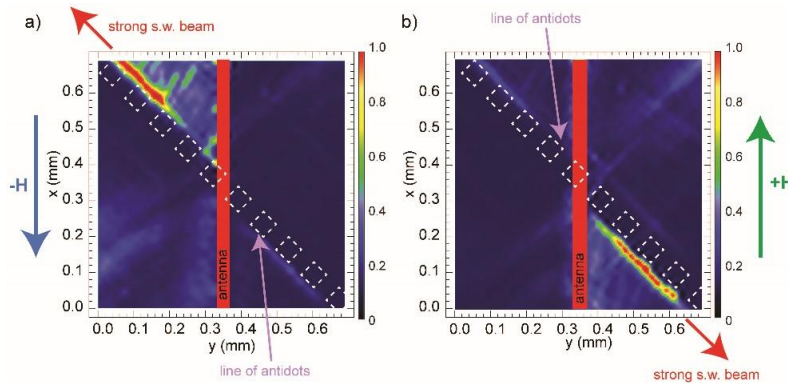


Figure. The strong spin waves beam formation combined with changing of the SW propagation direction. Two-dimensional mapping of the SW amplitude (detected with the BLS spectrometer) registered for a)  $-H$  and b)  $+H$ . The spin waves are generated by the microwave antenna (red vertical bar). Square holes ( $50\ \mu\text{m}$  size) in YIG film with period  $a=100\ \mu\text{m}$  created the antidots line marked by crosshatch.

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