

# Propagation of spin waves in ferrite films with metasurface

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MSSW propagation in YIG films with “leaky” and “resonant” subwave-length periodic metasurfaces (MS) was studied. “Leaky” MS was formed by ion-etching, while “resonant” MS - by stacking the array of magnetic microparticles and plane YIG film. The filtering effects and dispersion of MSSW in the film with 1D “leaky” MS were studied as functions of the angle  $\theta$  between the directions of magnetic field and grooves. Measured MSSW dispersion had anomalous regions whose number and width were minimal for  $\theta = 0$  and maximal for  $\theta = 90^\circ$  (Laue geometry). Formation of such regions was explained as the resonant interaction of the MSSW with leaky exchange modes of the periodic structure. The long-wavelength part of MSSW dispersion could be described as the dispersion of a homogeneous film in the magnetic field averaged over the structure period. MSSW diffraction in the Laue geometry and an analogy with the formation of the Borrmann and anti-Borrmann modes were also discussed.

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