

New excitations in Spintronics



Contribution ID: 18

Type: **Contributed talk**

Optical cooling of magnons

The magnetic insulator yttrium iron garnet (YIG) is used in microwave and optical technology. The record quality of its magnetization dynamics makes it also a promising material for classical and quantum information technology. Magnons, the elementary excitations of the magnetic order, can be studied in great detail by inelastic (Brillouin) light scattering experiments. Here, we present a study of the magnon-photon scattering in YIG spheres with long-lived optical whispering gallery modes in the infrared. We find resonantly enhanced scattering cross section that causes a large and controllable asymmetry between the Stokes (magnon generation) and anti-Stokes (magnon annihilation) scattering. These findings imply that magnons can be manipulated by light by selectively annihilating or creating a large number of magnons [PRL 121, 087205 (2018)]. We discuss options to further enhance the efficiency of the laser-induced magnon control.

Primary authors: SHARMA, Sanchar (Delft University of Technology); Prof. BLANTER, Yaroslav (Delft University of Technology); Prof. BAUER, Gerrit (Delft University of Technology)

Presenter: SHARMA, Sanchar (Delft University of Technology)