

Strong coupling of antiferromagnetic resonance to sub-terahertz cavity fields

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We study coupling of electromagnetic waves to antiferromagnetic resonance at terahertz (THz) frequencies [1]. Magnon-polaritons are investigated in ferromagnetic materials [2]. Antiferromagnetic materials that are interesting due to their high-frequency dynamics, however, there are very few reports of strong magnon-photon coupling in that case [3]. We reported experimental observation of magnon-polaritons in high-temperature antiferromagnet hematite α -Fe₂O₃. A cube of hematite was placed inside a 3-dimensional cavity that has the lowest resonance at about 0.24 THz. We measured transmission spectra in 200-350 GHz frequency band as a function of temperature at above room temperature. Frequency of the magnetic resonance rises with temperature and shows very clear avoided crossing with the first cavity mode. We estimate the cooperativity factor of the polariton states at about 40 [4].

References:

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We acknowledged support by the Sino-Swiss Science and Technology Cooperation (SSSTC) grant no. EG-CN 02 032019, EPFL and the SNF R'Equip under Grant No. 206021 144983.