Contribution ID : **55** Type : **Oral presentation**

THz magnetism - terra incognita beyond the conventional approximations

Thursday, 7 July 2022 09:00 (45)

Antiferromagnets are ideal candidates to reach THz landmark in data storage with no additional energy costs. However, the lack of a net magnetization in these materials requires exceedingly high magnetic fields to manipulate their spins, hindering not only applications, but even fundamental studies on writing bits on antiferromagnets. Here we propose an approach to empower THz control of antiferromagnetic order_by pushing antiferromagnet out of equilibrium through generation of coherent magnonic state. We will show that an antiferromagnet out of equilibrium is practically a different material. Generation of coherent magnonic states in antiferromagnets substantially modifies the susceptibility of antiferromagnetic spins to THz magnetic fields and facilitates energy transfer between otherwise noninteracting phononic and magnonic modes [1,2]. In this case, the generated impact on spins goes far beyond trivial superposition of excitations and can facilitate conceptually new ways for controlling antiferromagnetism. The proposed theoretical description suggests that spin dynamics in antiferromagnets is intrinsically non-linear and once coherent magnonic state is induced, additional channels of energy transfer between otherwise orthogonal modes open up.
[1] E. A. Mashkovich, K. Grishunin, R. Dubrovin, R. V. Pisarev, A. K. Zvezdin and A. V. Kimel, THz light driven coupling of antiferromagnetic spins to lattice, Science 374, 1608-1611 (2021).
[2] Th. Blank et al (in preparation)

Primary author(s) : KIMEL, Alexey (Radboud University)

Presenter(s) : KIMEL, Alexey (Radboud University)

Session Classification : Thu 07/07 Morning 1 / Abstract ID