TERAHERTZ AND OPTICAL SPINTRONICS IN FERRO- AND ANTIFERROMAGNETS

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After the recent progress in fields of ultrafast demagnetization [1] and intense terahertz (THz) sources [2], the THz spectroscopy has found its way to explore ultrafast spintronic phenomena. By covering energies from 0.4 to 200 meV, it complements optical pump-probe techniques by resonant probing of various excitations in solid states, such as electron scattering rate, spin-orbit interaction or antiferromagnetic resonance.

In this talk, we will show how time-resolved THz and optical spectroscopy can provide new insight into well established spintronic phenomena like anisotropic magnetoresistance [3], ultrafast demagnetization, or spin Hall and Seebeck effects [4,5], as well as the recently observed opto-electrical recording into antiferromagnetic metal CuMnAs [6].

[1] T. Seifert et al., Nature Phot. 10, 483 (2016).
[2] P. Němec et al., Nature Physics **14**, 229 (2018).
[3] L. Nádvorník et al., Phys. Rev. X 11, 021030 (2021).
[4] L. Nádvorník et al., Scientific Reports **6**, 22901 (2016).
[5] T. Seifert et al., Nature Communications **9**, 2899 (2018).
[6] Z. Kašpar et al., Nature Nanoelectronics **10**, 1038 (2020).