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TIME-RESOLVED OPTICAL AND TERAHERTZ STUDIES OF THIN-FILM FERROMAGNETS AND ANTIFERROMAGNETS

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Recent breakthroughs in electrical detection and manipulation of antiferromagnets have opened a new avenue in the research of non-volatile spintronic devices. Antiparallel spins in antiferromagnets lead to the insensitivity to magnetic field perturbations, multi-level stability and ultra-fast spin dynamics, which is also a major experimental challenge [1]. In this contribution we show how the know-how that we achieved in the pump-probe study of spin transport in non-magnetic heterostructures AlGaAs/GaAs [2], diluted ferromagnetic semiconductor (Ga,Mn)As [3] or terahertz magneto-resistance [4] can be transferred to the research of antiferromagnetic metal CuMnAs. In particular, we show the latest progress in studies of magnetic anisotropy [5], dynamics of heat dissipation [6] and even switching of memory devices by single femtosecond laser pulse [7] or terahertz excitation [8].
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[2] L. Nádvorník et al., Scientific Reports 6, 22901 (2016).
[3] P. Němec et al., Nature Physics 8, 411 (2012)
[4] L. Nádvorník et al., submitted to Nature Communications.
[5] V. Saidl, et al., Nature Photonics 11, 91 (2017)
[6] M. Surýnek et al., J. Appl. Phys. 127, 233904 (2020)
[7] Z. Kašpar et al., arXiv 1909.09071
[8] J. Heitz et al., submitted to Nano Letters.

Presenter: NÁDVORNÍK L. (Faculty of Mathematics and Physics, Charles University, Prague)

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