

Non-Relativistic Spin Currents and Torques in Antiferromagnets

Ing. Jakub Železný, Ph.D.

Institute of Physics of the Czech Academy of Sciences

Contrary to the early understanding of antiferromagnets as limited compared to ferromagnets, a rich landscape of phenomena in antiferromagnets has been demonstrated that could be utilized for various spintronics functionalities. Here, we discuss recent advances in understanding of how electrical current can induce spin currents or spin torques in antiferromagnetic systems, focusing primarily on non-collinear antiferromagnets and on phenomena that originate from the non-collinear order without requiring the relativistic spin-orbit coupling. We show that antiferromagnets can host spin-polarized currents and that these can be utilized for magnetic junctions, that antiferromagnets can be used for spin-charge conversion, potentially even without any spin loss, and that a non-relativistic current-induced torque analogous to the spin-orbit torque can exist in antiferromagnets.