

Ultrafast Magnetization Dynamics Viewed from the Non-equilibrium Band Structure

We present recent results from ultrafast laser-driven magnetization dynamics experiments on the rare-earth local-moment ferromagnets Gadolinium and Terbium. Our experiment combines angle-resolved photoemission spectroscopy (ARPES) with the VUV photon energies and time resolution made possible by high-order harmonic generation to scrutinize the non-equilibrium band structure following excitation of the ferromagnet by a short infrared pulse. On the timescale of a few picoseconds, transient changes of the minority and majority components of the exchange-split valence band reveal significant insight into the underlying microscopic processes. Furthermore, linear magnetic dichroism in photoemission allows us to simultaneously follow the magnetic response of the localized 4f electrons, from which the magnetic moment arises.

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